

Service Manual

Telephone Equipment



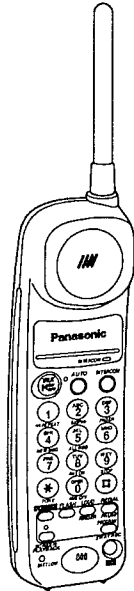
Cordless Phone with
Answering System

KX-TCM422-B KX-TCM422-W

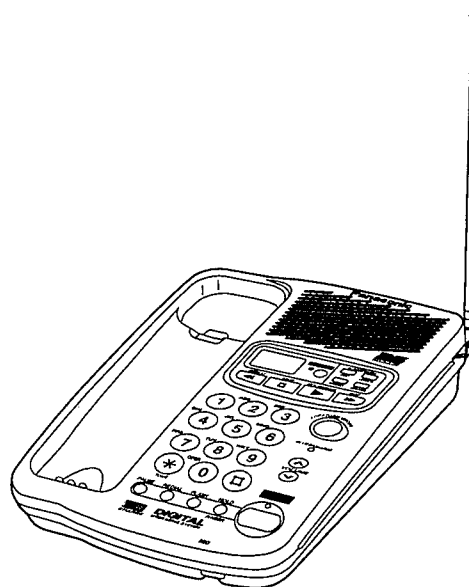
Black Version

White Version

(for U.S.A.)



(Portable Handset)



(Base Unit)

SPECIFICATIONS

General

Modulation:	FM, 5 kHz Deviation	Memory Capacity:	10 telephone numbers, up to 16 digits per station
Frequency Stability:	± 2.5 kHz		
Dial Type:	Tone (DTMF)/Pulse	Answering system	
Redial:	Last dialed number each time the Redial button is pressed	Greeting Message and Incoming Message:	Full digital recording Total recording time, 16 minutes
Pause:	3.5 seconds per pause		

	Base Unit	Portable Handset
Power Source: (Receiver Section)	AC adaptor KX-A11-6 (DC 12 V)	Built-in rechargeable Ni-Cd battery (PQXA36ASVC)
Receiving Frequency:	25 channels within 48.7 to 49.9 MHz	25 channels within 43.7 to 46.9 MHz
Adjacent Channel Rejection:	40 dB	40 dB
Sensitivity: (Transmitter Section)	1 dB μ V for 20 dB S/N	2 dB μ V for 20 dB S/N
Transmitting Frequency:	25 channels within 43.7 to 46.9 MHz	25 channels within 48.7 to 49.9 MHz
Jacks:	DC IN, Telephone line	
Antenna:	Telescopic	Rubber Flexible
Speaker:	2" (5 cm) PM dynamic	1 ³ / ₁₆ " (3 cm) ceramic
Microphone:	Condenser microphone	Condenser microphone
Dimensions (H×W×D):	2 ⁵ / ₁₆ "×6 ¹¹ / ₁₆ "×9" (59×170×229 mm)	11 ⁷ / ₈ "×2 ⁵ / ₃₂ "×1 ²³ / ₃₂ " (302×55×44 mm)
Weight:	1.32 lb (600 g)	0.52 lb (234g) with battery

Design and specifications are subject to change without notice.

Panasonic

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 WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

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LOCATION OF CONTROLS

●Base Unit

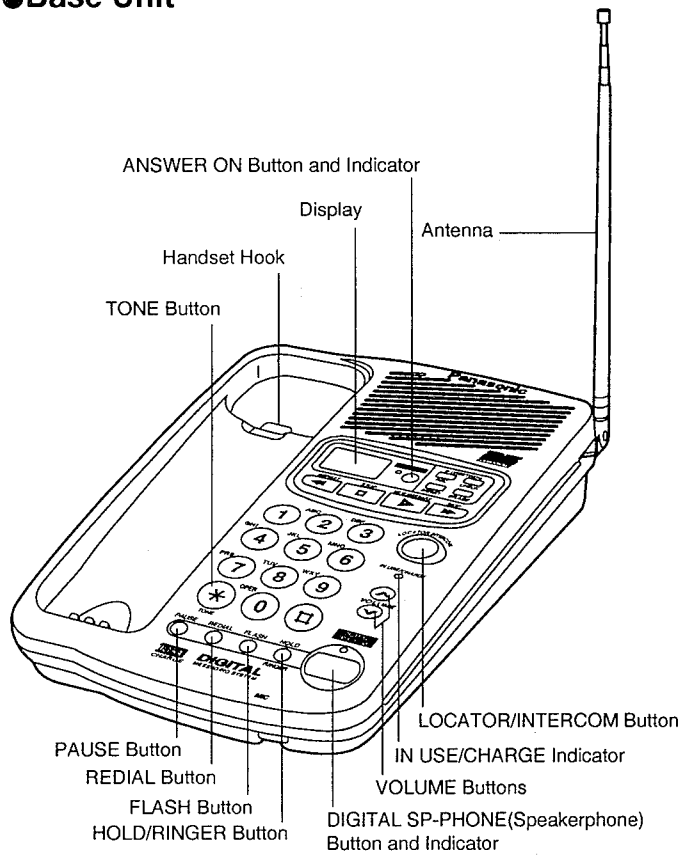


Fig. 1

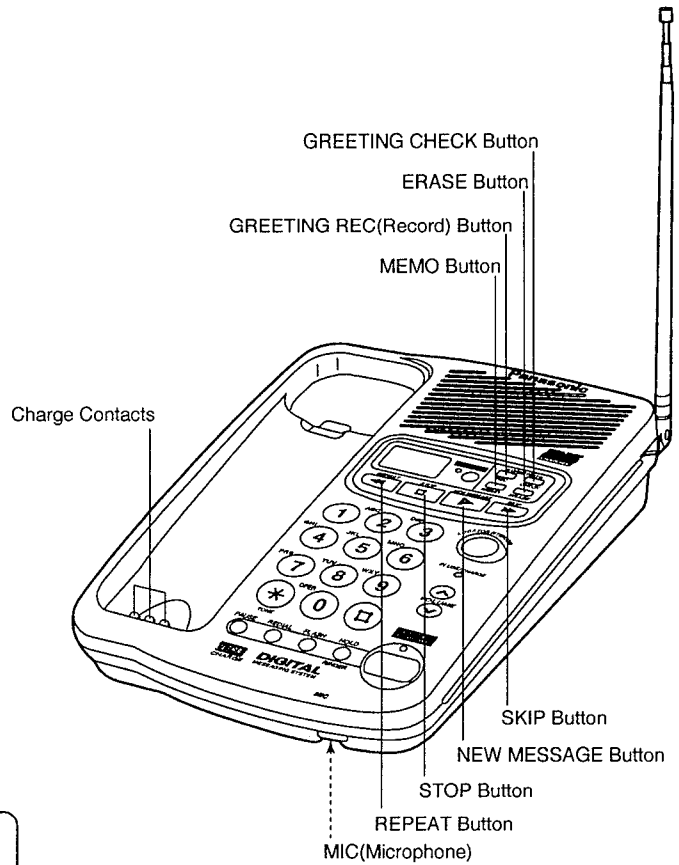


Fig. 2

●Portable Handset

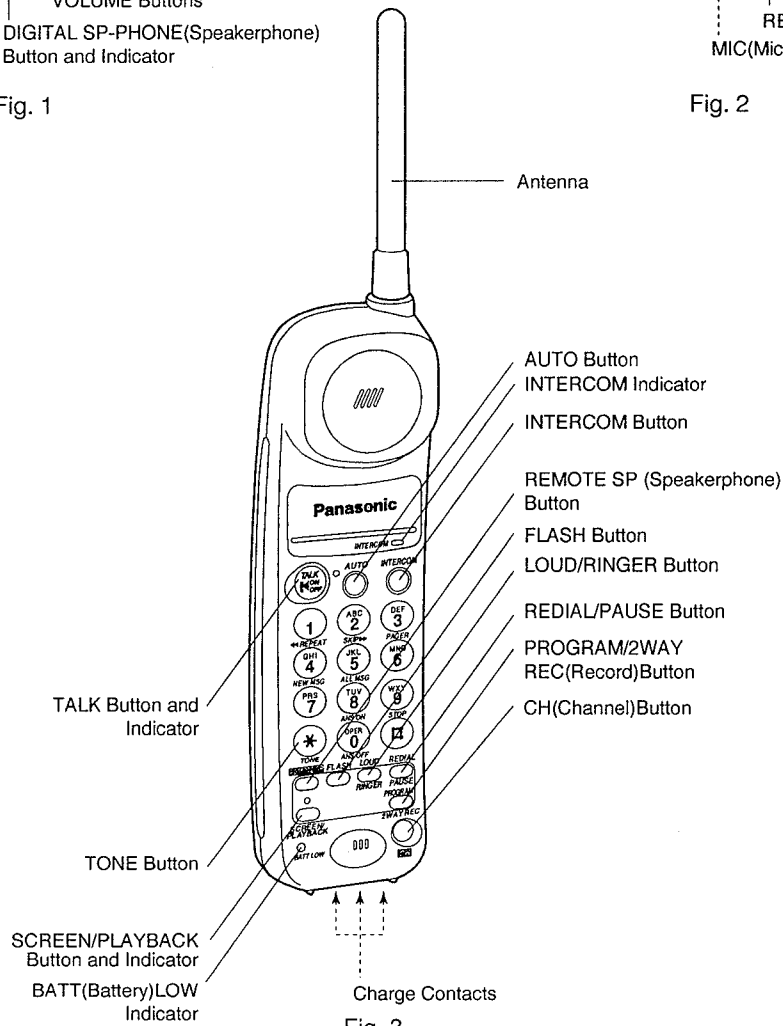
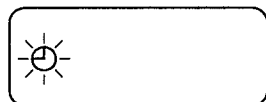
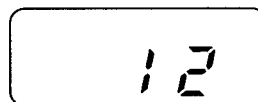


Fig. 3

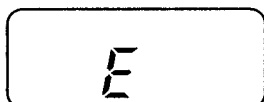
●Display of the base unit



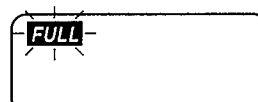
The clock needs adjusting.



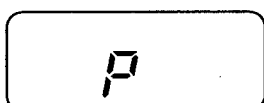
12 messages have been recorded.



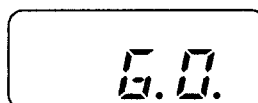
Your message was not recorded correctly.
Record it again.



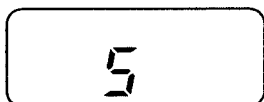
Memory is full. Erase some
or all of the messages.



The unit is in programming mode.



The recording time is
set to "greeting only".



The speaker volume level is set to "5".

You can select:

- 9 levels (0-8) while using the answering system.
- 8 levels (1-8) while using the speakerphone.



The base unit ringer
volume is set to OFF.



The pager call mode is set to ON.

Fig. 4

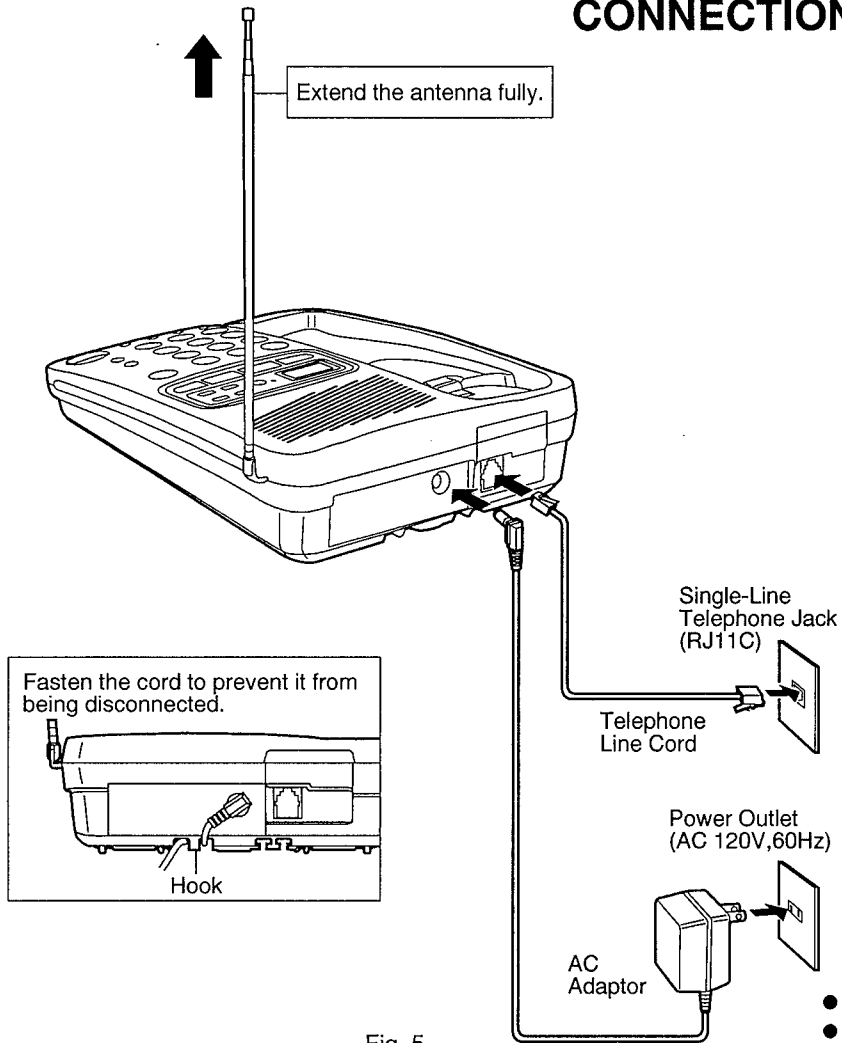
STANDARD BATTERY LIFE

If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 8 hours
While not in use (Stand-by)	Up to about 30 days

- Battery life may vary depending on usage conditions and ambient temperature.
- Clean the charge contacts with a soft cloth once a month, or the battery may not charge properly.
- Once the battery is fully charged, you do not have to place the handset on the base unit until the BATT LOW/PROG indicator flashes.
- The battery cannot be overcharged.

CONNECTION



This connection is for U.S.A. version only.

Refer to the simplified manual (cover) for Canada or other areas.

- USE ONLY Panasonic AC ADAPTOR KX-A11-6.
- The AC adaptor must remain connected at all times. (It may feel warm during use. This is normal.)

Adding Another Phone

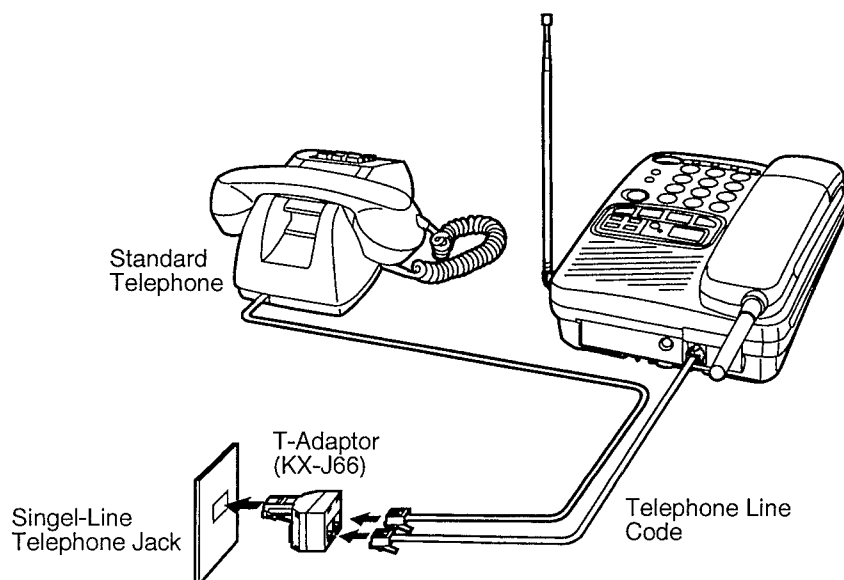


Fig. 6

OPERATIONS

NEW OPERATIONS

Simultaneous Keypad Dialing

You can use the base unit like a standard telephone. After pressing **TALK** to make a call with the handset near the base unit, you can also dial using the base unit keypad.

- 1 Handset:
Press **TALK**.

- 2 Base unit:
Dial a telephone number while hearing a dial tone with the handset.
● When the other party answers, talk using the handset.



- 3 Handset:
To hang up, press **TALK** or place the handset on the base unit.

Useful information

This feature is convenient when you need to enter numbers during a call using the handset (for example, to access an answering system, electronic banking service, etc.). You can enter numbers using the base unit keypad.

1. Handset:
Press **TALK**.
2. Handset:
Dial a telephone number.
● You may also dial with the base unit keypad.
3. Base Unit:
Enter the required numbers.
4. Handset:
To hang up, press **TALK** or place the handset on the base unit.

Simultaneous Keypad Dialling is available only after pressing **REMOTE SP** or **TALK**.

Remote Speakerphone

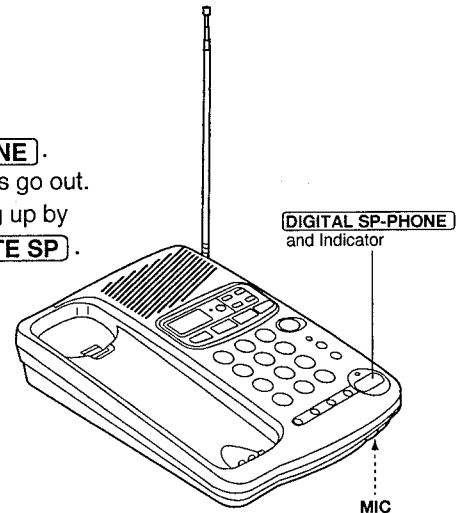
you can switch a call with the handset to the speakerphone easily.

- 1 Handset:
During a call with the handset, press **REMOTE SP**.
● The call is switched to the base unit.
● The INTERCOM indicator flashes.
● The DIGITAL SP-PHONE indicator lights.



- 2 Base unit:
Speak into the MIC.

- 3 Base unit:
To hang up, press **DIGITAL SP-PHONE**.
● The indicator lights go out.
● you can also hang up by pressing **REMOTE SP**.



When you use **REDIAL/PAUSE** or **REDIAL**, dial a stored number, etc, press **REMOTE SP** after dialing is completed.

You can turn on the base unit speakerphone by using the handset as a remote control.

Making calls with the remote speakerphone

1. Handset:
Press **REMOTE SP**.
2. Handset:
Dial a telephone number.
● You may also dial with the base unit keypad.
3. Base Unit:
Speak into the MIC.
4. Handset:
To hang up, press **REMOTE SP**.
● You may also hang up by pressing **DIGITAL SP-PHONE**.

When you redial

A number dialed with the handset keypad is saved in the handset. A number dialed with the base unit keypad is saved in the base unit.

To switch to handset (while using the remote speakerphone)

- Press **TALK**.
- You can continue the conversation using the handset.
 - To hang up, press **TALK** or place the handset on base unit.

When you use **REDIAL/PAUSE** or **REDIAL**, dial a stored number, etc, press **TALK** after dialing is completed.

Answering calls with the remote speakerphone

1. Handset:
Press **REMOTE SP**.
2. Base unit:
Speak into the MIC.
3. Handset:
To hang up, press **REMOTE SP**.
● You may also hang up by pressing **DIGITAL SP-PHONE**.

Storing the Pager Number

1 Press **PROGRAM/2WAY REC**.

- The TALK indicator flashes.

2 Press **SCREEN/PLAYBACK**.

- The indicator lights.
- "P" is displayed on the base unit.

3 Press **#**.

4 a) Enter your pager number.
(If necessary, press **REDIAL/PAUSE** twice.)

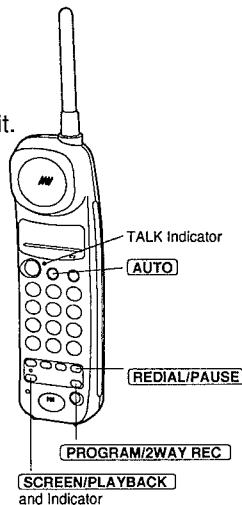
- b) Enter the call back number to be displayed on the pager.
(Press **#** if required by your pager company.)

- If you misdial, press

PROGRAM/2WAY REC

then restart from step1.

- You can enter up to 48 digits total.



5 When finished, press **PROGRAM/2WAY REC**.

- The indicator lights go out.

Your pager company may require a delay after the pager number is dialed. Contact your pager company regarding the required pause time.

Pressing **REDIAL/PAUSE** once creates a 3.5 second delay and counts as one digit.

To confirm the stored pager number

Press **TALK** → **AUTO** → **#**.

- The unit dials the stored number.
- If the pager does not beep, restart from step1 to store the number again.

To erase the stored pager number

Press **PROGRAM/2WAY REC** → **SCREEN/PLAYBACK** → **#** → **PROGRAM/2WAY REC**.

NORMAL OPERATIONS

Making Calls with the Handset

1 Press **TALK**.

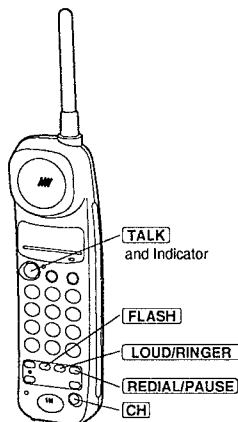
- The TALK indicator lights.

2 Dial a telephone number.

- If you misdial, press **FLASH** firmly then dial again.

3 To hang up, press **TALK** or place the handset on the base unit

- The TALK indicator light goes out.
- If an alarm tone sounds in step 1, move towards the base unit or place the handset on the base unit. Then try again.



To redial the last number

Press **TALK** → **REDIAL/PAUSE**.

To select the receiver volume LOW, MEDIUM (preset) or HIGH

Press **LOUD/RINGER** while talking.

- Each time you press the button, the volume level will change.
(MEDIUM → HIGH → LOW → MEDIUM → ...)

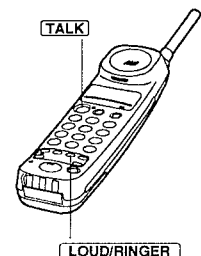
If noise interfaces with the conversation

Press **CH** to select a clear channel or move closer to the base unit.

Answering Calls with the Handset

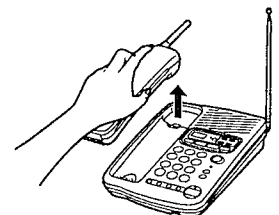
If the handset is off the base unit, press **TALK**.

- You can also answer a call by pressing any dialing button 0 to 9, *, or # (-Any Key Talk).



OR

If on the base unit, just lift it up.



Adjusting the handset ringer volume

Be sure the TALK indicator light is off.

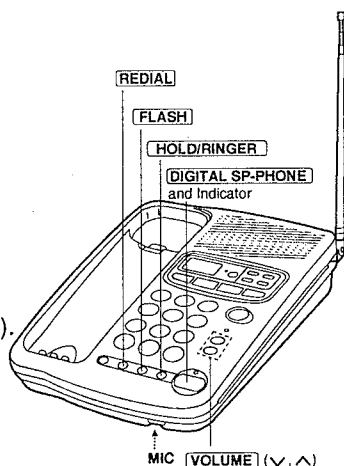
- To select HIGH (preset) or LOW, press **LOUD/RINGER** lightly. (Each time you press the button, the ringer volume will change.)
- To turn the ringer OFF, press **LOUD/RINGER** until 2 beeps sound.
- To turn the ringer ON, press **LOUD/RINGER** lightly. The ringer sounds at the HIGH level.

Lighted keypad

The dialing buttons will light while dialing and flash when a call is received. The lights will go out about 10 seconds after dialing or answering a call.

Making Calls with the Base Unit (Digital Duplex Speakerphone)

- 1 Press **DIGITAL SP-PHONE**.
●The Indicator lights.
- 2 Dial a telephone number.
●If you misdial, press **FLASH** firmly then dial again.
- 3 When the other party answers, speak into the MIC(microphone).
- 4 To hang up, press **DIGITAL SP-PHONE**.
●The indicator light goes out.



- While using the speakerphone, if the handset is on the base unit, you may switch to the handset by lifting it up.

To adjust the speaker volume (8 levels)

To increase, press **^**. To decrease, press **v**.

To redial the last number

Press **DIGITAL SP-PHONE** → **REDIAL**.

To put a call on hold

Press **HOLD/RINGER**.

- The DIGITAL SP-PHONE indicator flashes.
- If you put a call on hold for 6 minutes, a warning tone will sound.
The call will be disconnected after a total of 10 minutes.

To release the hold

For the base unit, press **DIGITAL SP-PHONE**.

For the handset, press **TALK** or lift the handset off the base unit.

- You may also press **REMOTE SP** on the handset to release the hold at the base unit.
- If another phone is connected on the same line, you can also release the hold by lifting its handset.

Answering Calls with the Base Unit

- 1 Press **DIGITAL SP-PHONE**.
- 2 Speak into the MIC.
- 3 To hang up, press **DIGITAL SP-PHONE**.

Adjusting the base unit ringer volume

Be sure the DIGITAL SP-PHONE indicator light is off.

- To select HIGH (preset) or LOW, press

HOLD/RINGER lightly.

(Each time you press the button, the ringer volume will change.)

- To turn the ringer OFF, press **HOLD/RINGER** until 2 beeps sound.

"**RINGER OFF**" is displayed.

- To turn the ringer ON, press **HOLD/RINGER** lightly. The ringer sounds at the HIGH level.

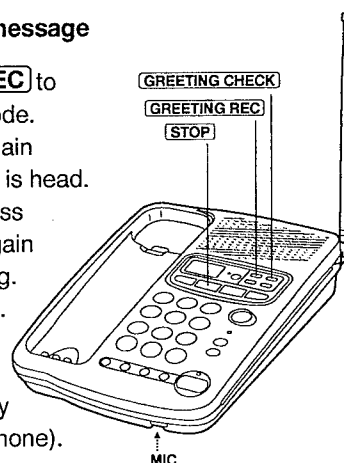
Greeting Message

you can prepare a personal greeting message. If you do not, one of two pre-recorded greetings will be played when a call is received.

All message (greeting, incoming, memo, etc.) are stored in digital memory. The total recording time is about 16 minutes. We recommend you record a brief greeting message in order to leave more time in memory.

To record a greeting message

- 1 Press **GREETING REC** to start the recording mode.
●"Press RECORD again to record greeting." is heard.
- 2 Within 5 seconds, press **GREETING REC** again to record your greeting.
●A long beep sounds.
- 3 After the long beep, speak clearly about 8 inches (20 cm) away from the MIC (microphone).
●The display shows the elapsed recording time.
- 4 When finished, press **STOP**.
●To check the recorded greeting, press **GREETING CHECK**.
●To change the message, repeat from step 1.



To erase the recorded greeting message

Press **GREETING CHECK** → press **ERASE** while the message is being played.

- The unit will answer a call with a pre-recorded greeting.

DISASSEMBLY INSTRUCTIONS

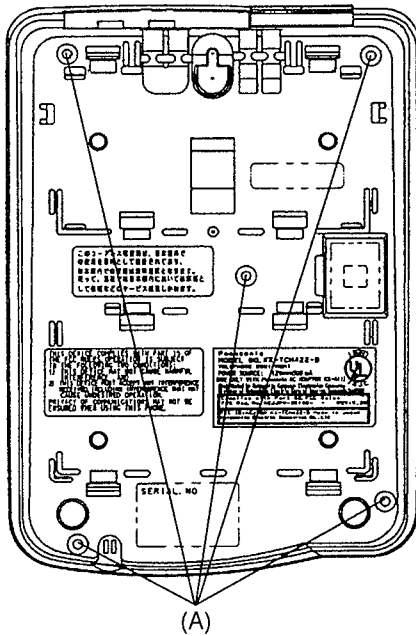
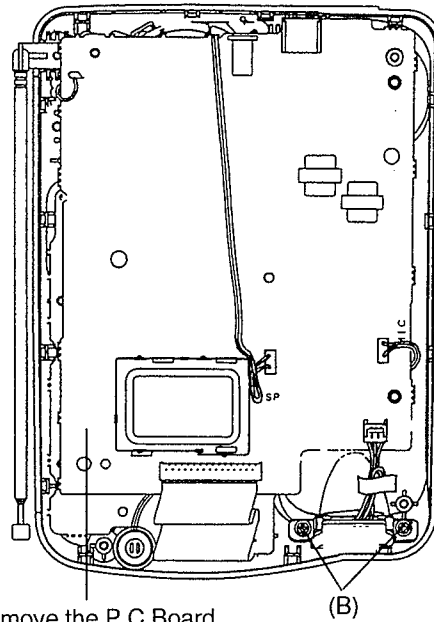


Fig. 7



Remove the P.C.Board

Fig. 8

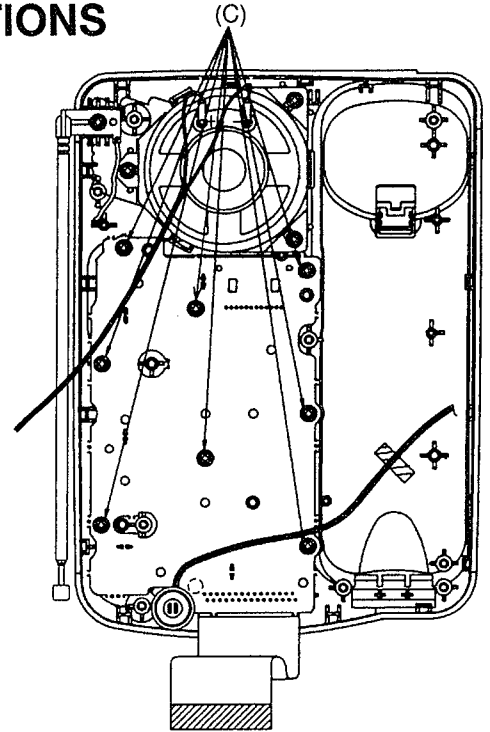


Fig. 9

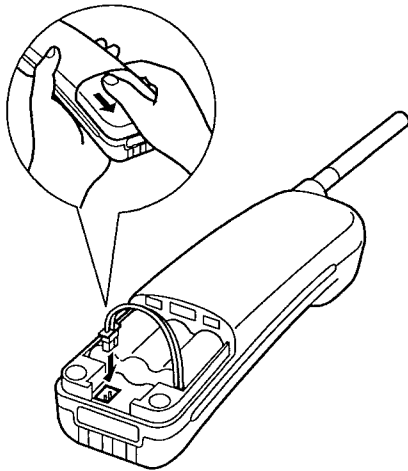


Fig. 10

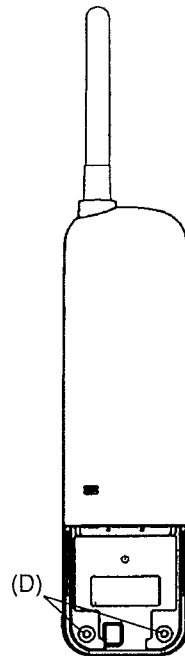
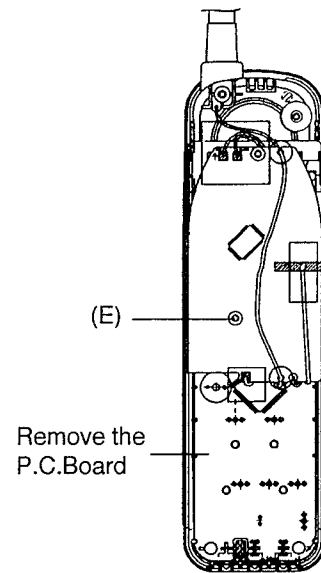


Fig. 11



Remove the P.C.Board

Fig. 12

Ref. No.	Procedure	Shown in Fig.—	To remove—	Remove—
1	1	7	Lower Cabinet	Screws (3×14)..... (A)×5
2	1, 2	8	Main Printed Circuit Board and Battery Terminal Board	Screws (3×8)..... (B)×2
3	1, 2, 3	9	Operation Printed Circuit Board	Screws (3×8)..... (C)×8
4	4, 5	10	Rear Cabinet	Remove the battery compartment cover
5		11		Screws (2.6×14)..... (D)×2
6	4~6	12	Printed Circuit Board	Screw (2.6×10)..... (E)×1

CPU DATA (BASE UNIT)

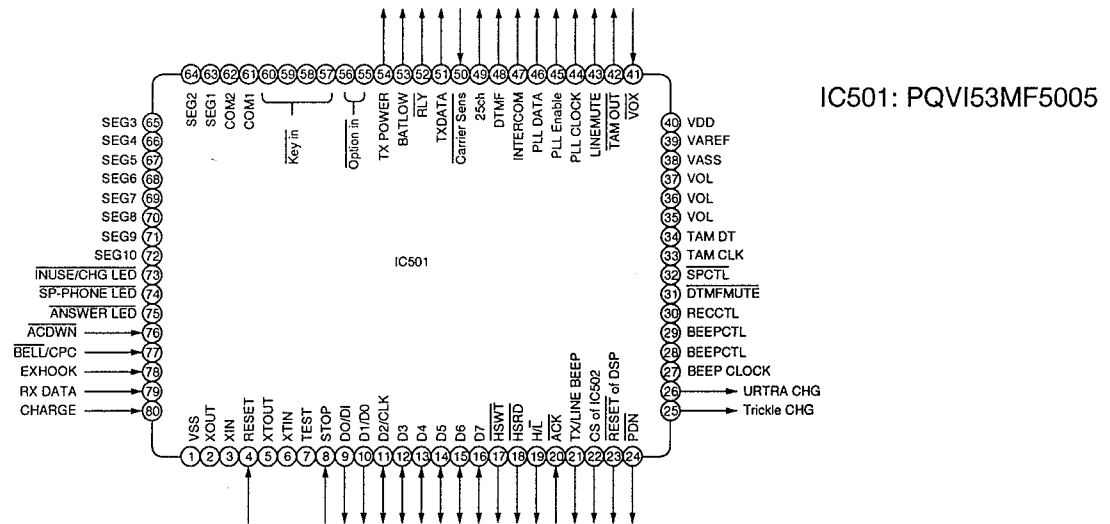


Fig. 13

Pin No.	Description	I/O	High	High-Z	Low	Pin No.	Description	I/O	High	High-Z	Low
1	VSS	-	-	-	GND	41	VOX	I	-	-	Active
2	XOUT	O	-	-	-	42	TAM OUT	O	MUTE	-	Unmute
3	XIN	I	-	-	-	43	LINEMUTE	O	MUTE	-	Unmute
4	RESET	I	Normal	-	RESET	44	PLL CLOCK	O	(H/L)	-	Normal
5	XTOUT	O	-	-	-	45	PLL Enable	O	Latch	-	Normal
6	XTIN	I	-	-	-	46	PLL DATA	O	(H/L)	-	Normal
7	TEST	I	-	-	GND	47	INTERCOM	O	INTERCOM	-	Normal
8	STOP	I	Normal	-	STOP	48	DTMF	O	-	-	-
9	DO/DI	I/O	DATA	Normal	DATA	49	25ch	O	NEW CH	-	OLD CH
10	D1/D0	I/O	DATA	Normal	DATA	50	Carrier Sens	I	Low	-	High
11	D2/CLK	I/O	DATA	Normal	DATA	51	TXDATA	O	1	-	0
12	D3	I/O	DATA	Normal	DATA	52	RLY	O	OFF	-	ON
13	D4	I/O	DATA	Normal	DATA	53	BATLOW	I	Battery	-	Batt Low
14	D5	I/O	DATA	Normal	DATA	54	TX POWER	O	POWER ON	-	POWER OFF
15	D6	I/O	DATA	Normal	DATA	55	Option in	I	DISABLE	-	ENABLE
16	D7	I/O	DATA	Normal	DATA	56	Option in	I	DISABLE	-	ENABLE
17	HSWT	O	-	-	Write to DSP	57	Key in	I	DISABLE	-	ENABLE
18	HSRD	O	-	-	Read from DSP	58	Key in	I	DISABLE	-	ENABLE
19	H/L	O	High byte	-	Low byte	59	Key in	I	DISABLE	-	ENABLE
20	ACK	I	DSP Active	-	DATA RECEPTION OK	60	Key in	I	DISABLE	-	ENABLE
21	TX/LINE BEEP	O	Active	-	Normal	61	COM1	O	COM1 mode	-	COM1 mode
22	CS of IC502	O	ON	-	OFF	62	COM2	O	COM2 mode	-	COM2 mode
23	RESET of DSP	O	RESET	-	NORMAL	63	SEG1	O	-	-	-
24	PDN	O	POWER ON	-	POWER DWN	64	SEG2	O	-	-	-
25	Trickle CHG	O	Trickle	-	Normal	65	SEG3	O	-	-	-
26	ULTRA CHG	O	ULTRA	-	Normal	66	SEG4	O	-	-	-
27	BEEP CLOCK	O	Active	-	Normal	67	SEG5	O	-	-	-
28	BEEPCTL	O	-	High	Low	68	SEG6	O	-	-	-
29	BEEPCTL	O	-	High	Low	69	SEG7	O	-	-	-
30	RECCTL	O	REC MODE	-	Normal	70	SEG8	O	-	-	-
31	DTMFMUTE	O	Unmute	-	MUTE	71	SEG9	O	-	-	-
32	SPCTL	O	Normal	-	SP-Phone	72	SEG10	O	-	-	-
33	TAM CLK	O	-	-	-	73	INUSE/CHG LED	O	-	LED OFF	LED ON
34	TAM DT	O	-	-	-	74	SP-PHONE LED	O	-	LED OFF	LED ON
35	VOL	O	-	High	Low	75	ANSWER LED	O	-	LED OFF	LED ON
36	VOL	O	-	High	Low	76	ACDWN	I	AC	-	AC DOWN
37	VOL	O	-	High	Low	77	BELL/CPC	I	CPC	-	BELL
38	VASS	-	-	-	GND	78	EXHOOK	I	EXHOOK	-	-
39	VAREF	-	VDD	-	-	79	RX DATA	I	1	-	0
40	VDD	-	VDD	-	-	80	CHARGE	I	Charge	-	No Charge

EXPLANATION OF IC TERMINALS (BASE UNIT)

IC805: PQVISC111815

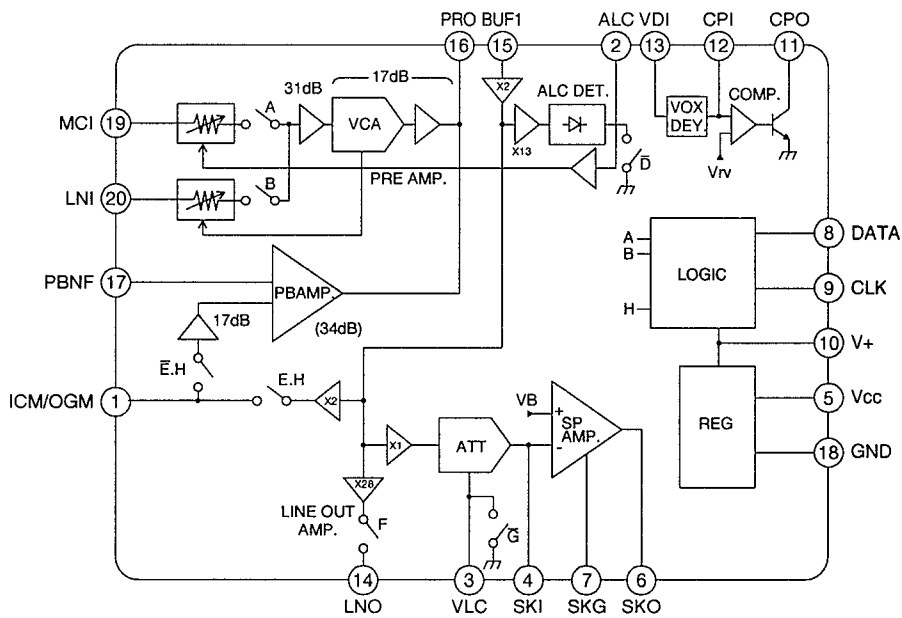


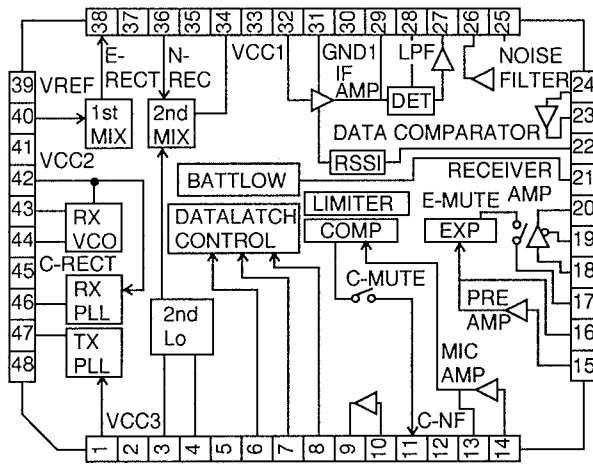
Fig. 14

• Pin Description

Pin No.	Name	Description
1	ICM/OGM	I/O for ICM head. I/O impedance is approximately 20 kohm that keeps high impedance sufficient for head load.
2	ALC	For connection to CR for ALC detection smoothing. The time constant of the CR decides the recovery time. The attack time depends on the values of C and internal resistance (approx. 8.5 kohm).
3	VLC	Volume control input. The speaker output controlled by changing the volume resistance between this pin and GND.
4	SKI	Reverse input of the speaker amplifier. The gain and frequency characteristics are set by external CR. Non-reverse input is biased by internal power source (approx. 1/2 Vcc).
5	Vcc	Power source of IC except LOGIC part.
6	SKO	Output of speaker amplifier. Sets frequency characteristics by connecting to Pin 4 in parallel. Speaker's impedance is normally 30 ohms.
7	SKG	GND speaker amplifier output part.
8	DATA	Input of control data for mute mode. For serial synchronous input with clock signal.
9	CLK	Clock input for data input synchronization. Controls shift register by data bit at fall, and latches by reading data at rise.
10	V+	5.4 V stable output to supply bias with microphone.
11	CPO	output of comparator. Connected to open-collector of NPN transistor.
12	CPI	Input of VOX detector comparator. Compares internal reference voltage with gained voltage, and has a bit hysteresis characteristics.
13	VDI	Input of VOX detector.
14	LNO	Output of buffer amplifier for line output. Current amplifier.

KX-TCM422-B/KX-TCM422-W

Pin No.	Name	Description
15	BUFI	Inputs of Recording amplifier, line output amplifier, speaker amplifier, and ALC detector. These are input after voltage/radio conversion by CR between this pin and pin 16.
16	PRO	Output of MIC/LINE amplifier and playback amplifier.
17	PBNF	Reverse input of playback amplifier for controlling frequency characteristics. The CR network between this pin and Pins 16 and 18 set frequency and gain.
18	GND	GND for all ICs except speaker amplifier.
19	MCI	Input of microphone amplifier. The input resistance is normally 33 kohms.
20	LNI	Input of line amplifier. The same configuration as MCI.



Part No.
IC201: PQVITB31224H (Base Unit)
IC1: PQVITB31224R (Portable Handset)

Fig. 15

Pin No.	Name	Description
1	TX-IN	Input terminal of TX-VCO
2	VCC3	Power supply terminal
3	LO-1	Local oscillator input output terminal
4	LO-2	Colpitts oscillating circuit consists of internal emitter follower circuit and external crystal. Additionally external injection through pin 3 is available.
5	SIG OUT	Detection signal output terminal, which is an open drain.
6	CLK	Clock input terminal
7	DATA	Serial data input terminal
8	STB	Strobe signal input terminal
9	FIL-OUT	Filter amplifier output terminal
10	FIL-IN	Filter amplifier input terminal
11	COMP-OUT	Compressor output
21	BAT-ALM	Battery alarm terminal goes high when power supply voltage VCC becomes VBAT-L or less. Data bit controls the detection voltage. This terminal is an open collector output.
22	RSSI	DC voltage is output according to the input signal level of IF amplifier. The dynamic range is approximately 70dB.
23	DATA-OUT	Wave arrangement output terminal. This terminal is an open collector output.
24	D-COMP-IN	Data comparator input terminal to which demodulated signal of data is input.
25	N FIL-IN	Noise filter input output terminal. BPF consists of external condenser and resistor. This terminal is connected to the rectifier circuit through inside coupling condenser.
26	N FIL-OUT	
27	AF-OUT	Demodulation output signal terminal. Carrier leak is decreased by built-in LPF. Output impedance is approximately 360Ω.
28	QUAD	Phase input terminal of FM demodulator
37	E-RECT	Connects to the capacitor for rectification in full-wave rectifier circuit of expander.
38	1st MIX-OUT	Mixer output terminal which is connected to the external filter. Output impedance is approximately 330Ω (standard).
39	V REF	Reference voltage of compander which is passed through inside buffer.
40	1st MIX-IN	Mixer input terminal. The mixer is applied the double balanced mixer method.
41	VCC2	Regulator terminal, which outputs 2.0V.
42	VCO-CONT	RX-VCO voltage control terminal
43	VCO-1	RX-VCO resonant terminal
44	VCO-2	
45	C-RECT	Rectifier terminal of compressor. The circuit configuration is the same with E-RECT terminal.

KX-TCM422-B/KX-TCM422-W



IC802,IC803 : PQVIMCL548DW

Fig. 16

• Pin Description

Pin No.	Pin Name	Function
1	RO+	Recept the outputted analog.
2	RO-	Recept the outputted analog.
3	PI	Input the power amp.
4	PO-	Output the power amp.
5	PO+	Output the power amp.
6	Vdd	Positive power supply pin.
7	FSR	Frame synchronization, reception
8	CR	Recept the data.
9	BCLKR	Recept the bit clock.
10	PDI	Input the power down.
11	MCLK	Master Clock pin.
12	BCLKT	Transmit the bit clock.
13	DT	Transmit the data.
14	FST	Frame synchronization, transmission
15	Vss	Negative power supply pin.
16	Mu/A	Select the Mu/A.
17	TG	Transmit gain
18	TI-	Transmit the inputted analog.
19	TI+	Transmit the inputted analog.
20	VAG	Output the analog ground.

CPU DATA (PORTABLE HANDSET)

IC202:PQVI0008GE33

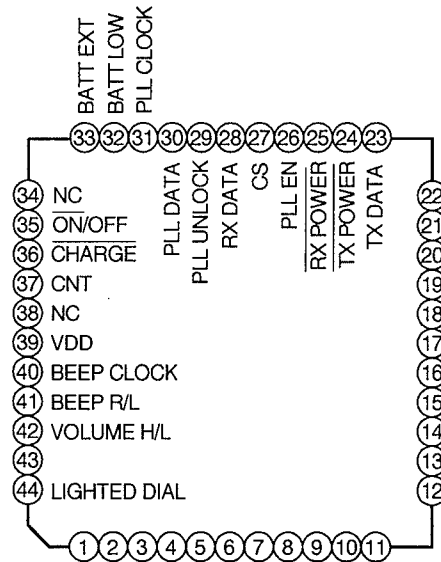


Fig. 17

Pin No.	Description	I/O	High	High-Z	Low	Pin No.	Description	I/O	High	High-Z	Low
1	Option Strobe 1	O	Normal		Active	25	RX Power	O	Off		On
2	Option Strobe 0	O	Normal		Active	26	PLL En	O	Latch		Normal
3	Key Strobe 4	O	Normal		Active	27	Squelch	I	Electric Field Low		Electric Field High
4	Key Strobe 3	O		Normal	Active	28	RX Data	I	(Data)		Normal
5	Key Strobe 2	O		Normal	Active	29	PLL Unlock	I	Unlock		Lock
6	Key Strobe 1	O		Normal	Active	30	PLL Data	O	(Data)		Normal
7	Key Strobe 0	O		Normal	Active	31	PLL Clock	O	(Clock)		Normal
8	Key In 3	I	Off		On	32	Batt Low	I	High		Low
9	Key In 2	I	Off		On	33	Battery	I	High		Low
10	Key In 1	I	Off		On	34	Not Used				
11	Key In 0	I	Off		On	35	On/Off	I	Off		On
12	Not Used					36	Charge (Battery Terminal)	I	Normal		Charge
13	LED (SCREEN)	O		Off	On	37	Charge (Control)	I	Base Unit		Charger
14	LED (BATT LOW)	O		Off	On	38	Internally Conn.				
15	LED (TALK)	O		Off	On	39	VDD				
16	LED (INTERCOM)	O		Off	On	40	Beep Clock	O	Normal		(Clock)
17	GND					41	Beep Control	O	Low		High
18	Sub Clock	I				42	RX Volume Selector	O	1		0
19	(32.768kHz)	I				43	RX Volume Selector	O	1		0
20	Reset	I	Normal		Reset	44	LIGHTED DIAL	O	On		Off
21	Main Clock	I									
22	(3.99MHz)	I									
23	TX Data	O	(Data)		Normal						
24	TX Power	O	Off		On						

KX-TCM422-B/KX-TCM422-W**CONFIRMATION (TAM)****How to set the test mode:**

1. Set S10 to ON (Power supply is turned ON).
2. After pressing S11 for 500 msec, separate S11 (The unit becomes TAM test mode).

When replacing these parts, confirm as shown below table.

Replace Parts	Confirmation items	Test Mode	Procedure
IC801~IC803	(A) Greeting Message Characteristics	TAM Test Mode	1. Set S6, S12, S13, S14 to ON. 2. Record the GREETING with a 1 kHz, -45 dBm sine wave MIC input signal through the capacitor 50V, 1μF. 3. Confirm the speaker output level VR MAX (8) is $+2 \pm 4$ dBm. 4. Confirm the Line output level (600Ω load) is $+10 \pm 4$ dBm.
IC801~IC803	(B) ICM Characteristics	TAM Test Mode	1. Set S6, S9, S14 to ON. 2. Record the ICM with a 1 kHz, -30 dBm line input signal. 3. Confirm the speaker output level VR MAX (8) is $+2 \pm 4$ dBm. 4. Confirm the Line output level (600Ω load) is $+10 \pm 4$ dBm.

The connection of confirmation equipments are as shown in pages 29 and 30.

CPU OPTIONS**Base Unit**

Diode No.	Description	Diode Open	Diode Connect
D514	Tone/Pulse Selector	Tone	Pulse
D515	Reading EEPROM	Not Read	Read
D518	9 bit Data Mute	9 bit Data Mute	Not Mute
D519	VOX Detect	Detect	Not Detect
D511	Dual Key	Disable	Enable
D512	Quick Charge	Disable	Enable
D509	Flash Time	0 700 msec	0 400 msec 1 250 msec 1 80 msec
D510	Flash Time	0	1 0 1
D507	Ring Detect	1 Ring/600 msec	1 Ring/250 msec
D508	Speakerphone	Disable	Enable
D505	BEAT Measure	CH25	CH23
D506	% Break	61%	67%
D503	43-49 MHz	0 U.S.A.CH25	0 30-40 MHz 1 43-49 MHz 1 43-49 MHz
D504	30-40 MHz	0	1 0 CH10 1
D501	TAM Test Mode	Normal	Test

Portable Handset

Diode No.	Description	Diode Open	Diode Close
D209	Test Mode	Normal	Test Mode
D208	Model with TAM	—	Used
D207	43 MHz / 49 MHz	Not Measured	Measured
D206	Test Mode CH	CH25	Imagination CH
D213	Tone/Pulse	Program	BX: Prohibition
D212	30 MHz / 40 MHz	Not Measured	Measured
D211	Battery Low LED	30 min. Light	10 min. Light
D210	Trickle Receive	2.5 sec.	2 sec.

FREQUENCY TABLE (MHz)

	BASE UNIT		PORTABLE HANDSET	
	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Frequency
1	43.720	48.760	48.760	43.720
2	43.740	48.840	48.840	43.740
3	43.820	48.860	48.860	43.820
4	43.840	48.920	48.920	43.840
5	43.920	49.020	49.020	43.920
6	43.960	49.080	49.080	43.960
7	44.120	49.100	49.100	44.120
8	44.160	49.160	49.160	44.160
9	44.180	49.200	49.200	44.180
10	44.200	49.240	49.240	44.200
11	44.320	49.280	49.280	44.320
12	44.360	49.360	49.360	44.360
13	44.400	49.400	49.400	44.400
14	44.460	49.460	49.460	44.460
15	44.480	49.500	49.500	44.480
16	46.610	49.670	49.670	46.610
17	46.630	49.845	49.845	46.630
18	46.670	49.860	49.860	46.670
19	46.710	49.770	49.770	46.710
20	46.730	49.875	49.875	46.730
21	46.770	49.830	49.830	46.770
22	46.830	49.890	49.890	46.830
23	46.870	49.930	49.930	46.870
24	46.930	49.990	49.990	46.930
25	46.970	49.970	49.970	46.970
A	46.990	49.950	49.600	44.720
B	44.100	49.130	—	46.300
C	—	49.320	49.620	44.560

ADJUSTMENTS (BASE UNIT)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy
The base unit dose not respond to a call from portable handset.	Make adjustments in item (A)
The base unit dose not transmit or the transmit frequency is off.	Make adjustments in item (B)
The transmit frequency is off.	Make confirmations in item (C)
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.	Make adjustments in item (D)
The reception sensitivity of base unit is low with noise.	Make adjustments in item (E)
The transmit level is large or small.	Make adjustments in item (F), (G)
The reception level is large or small.	Make adjustments in item (H)
The unit does not link.	Make confirmations in item (I)

Unit condition:

Remove the antenna from P.C Board of the base unit.

How to set the test mode:

1. In pressing S1 and "UP" switch, set S10 to ON (Power supply is turned ON).
2. Separate S1 and "UP" switch. The unit becomes test mode (1).
3. The state of the unit changes as following when "NEW MESSAGE" switch is pressed.

	Test Mode	RX Freq.	TX Freq.	Mode
Power supply is turned ON	Test Mode (1)	CH25	CH25	Talk
Press "NEW MESSAGE" switch 1 time	Test Mode (2)	CHA	CHA	Talk
Press "NEW MESSAGE" switch 1 time	Test Mode (3)	CHB	CHB	Talk
Press "NEW MESSAGE" switch 1 time	Test Mode (4)	CHC	CH1	Talk
Press "NEW MESSAGE" switch 1 time	Test Mode (5)	CH1	CHB	Int'com
Press "NEW MESSAGE" switch 1 time	Test Mode (6)	CH1	CHB	Locator

When replacing these parts, adjust as shown below table.

Replace Parts	Adjustment items	Test Mode	Adjustment point	Procedure
IC201, T203	(A) RX VCO Adjustment	Test Mode (1)	T203	1. Set S3 to ON. 2. Adjust T203 so that the reading of the Digital Voltmeter is $3.5V \pm 0.1 V$.
D301, T301	(B) TX VCO Adjustment	Test Mode (1)	T301	1. Set S2 to ON. 2. Adjust T301 so that the reading of the Digital Voltmeter is $2.3 V \pm 0.1 V$.
DUP301, T202, X201	(C) TX Frequency Cofirmation	Test Mode (3)	—	1. Set S8 to ON. 2. Confirm so that the reading of the frequency counter is $44.100 \text{ MHz} \pm 500 \text{ Hz}$.

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
VR302, Q302	(D) TX Power Adjustment	Test Mode (2)	VR302	1. Set S4 to ON. 2. Adjust VR302 so that the reading of the RF VTVM is peak level. 3. Adjust VR302 so that the reading of the RF VTVM is $270 \text{ mV} \pm 10 \text{ mV}$.
T201	(E) RX Sensitivity Adjustment	Test Mode (2)	T201	1. Set S5 to ON. 2. Apply a $60\text{dB } \mu\text{Vemf}$ output from S.S.G. (modulation frequency 1kHz, dev. 0kHz). 3. Adjust T201 so that the reading of the RF VTVM is maximum output (10~25 mV).
T202	(F) Line Output Maximum Adjustment	Test Mode (3)	T202	1. Set S5 and S6 to ON. 2. Apply a $40\text{dB } \mu\text{Vemf}$ output from S.S.G. (modulation frequency 1kHz, dev. 0 kHz), and adjust T202 so that reading of the AF VTVM is $0.9 \text{ V} \pm 0.05 \text{ V}$.
VR201	(G) Line Output Level Adjustment	Test Mode (3)	VR201	1. Set S5 and S6 to ON. 2. Apply a $40\text{dB } \mu\text{Vemf}$ output from S.S.G. (modulation frequency 1kHz, dev. 3kHz). 3. Adjust VR201 so that the reading of the AF VTVM is $-5.0\text{dBm} \pm 0.5\text{dBm}$ (600Ω load).
VR301	(H) Line Input Modulation Adjustment	Test Mode (3)	VR301	1. Set S5, S8 and S9 to ON. 2. Input via loop simulator 1.0kHz, -20.0 dBm/60Ω (measured at T-R) signal. 3. Apply a 40 dB μVemf output from S.S.G. (modulation frequency 1kHz, dev. 0kHz). 4. Adjust VR301 so that the reading of the FM Deviation Meter is $4.0 \text{ kHz} \pm 0.1\text{kHz}$.
IC201	(I) Carrier Sensitivity Confirmation	Test Mode (4)	—	1. Set S5, S8 to ON. 2. Apply a $35\text{dB } \mu\text{Vemf}$ output from S.S.G. (modulation frequency 1kHz, dev. 3kHz). Confirm so that the oscilloscope becomes Low. 3. Apply a $15\text{dB } \mu\text{Vemf}$ output from S.S.G. (modulation frequency 1kHz, dev. 3kHz). Confirm so that the oscilloscope becomes High.

The connection of adjustment equipments are as shown on pages 29 and 30.

■ FOR SCHEMATIC DIAGRAM [BASE UNIT (pages26~28)]

1. DC voltage measurements are taken with electronic voltmeter from negative voltage line.

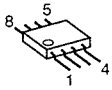
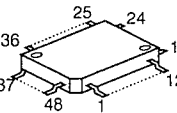
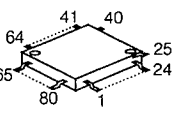
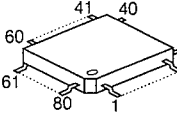
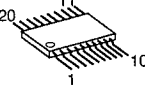
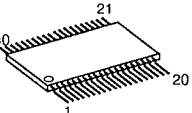
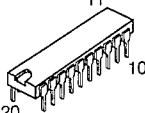
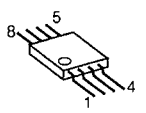
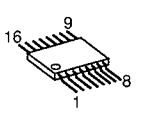
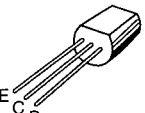
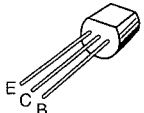
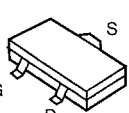
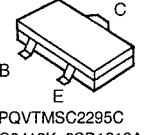
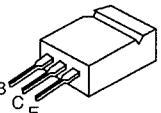
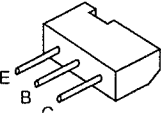
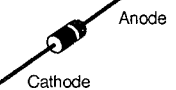
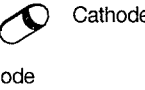
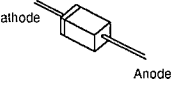
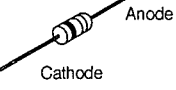
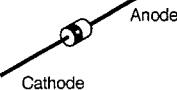
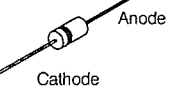
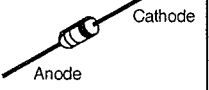
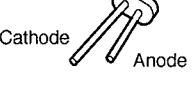
This schematic diagram may be modified at any time with development of new technology.

Important Safety Notice

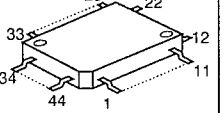
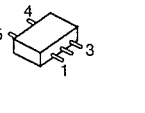
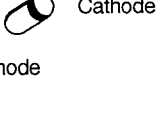
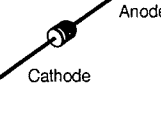
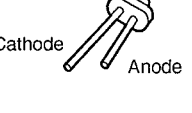
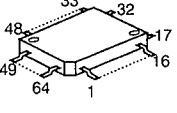
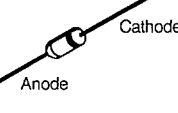
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

(BASE UNIT)

 AN6183SAE1 PQVI93LC46XI	 PQVITB31224H	 PQVI53MF5005	 PQVID6471A	 PQVIMCL548DW
 PQVIKM29N4TC	 PQVISC111815	 PQVINJM4558M	 PQVIBU4053BF	 2SA1625, 2SC2120
 2SC1740S	 2SK543	 PQVTMSC2295C 2SC2412K, 2SD1819A 2SB709A, 2SD601A PQVTFB1A4M, 2SB1218A PQVTDTA114YU	 2SD2137	 2SD1994A 2SD1991A
 PQVDS1ZB40F1	 MA110	 PQVDKV1832C3	 MA4100, MA4062 MA4047	 1SS119
 MA700A	 PQVDMTZ3R6 MA4220	 LNJ301MPUJA PQVDSL210VC		

(PORTABLE HANDSET)

 PQVI0008GE33	 PQVIXCC3501P PQVIS80730AL	 PQVTDTC114EU 2SD601A, 2SB709A PQVTD123T146 XN1116, 2SC2295 PQVTMSC2295C PQVT143XK146	 MA110 MA728	 PQVDS5688G
 LNJ301MPUJA PQVDSL210VC	 PQVITB31224R	 MA840BTAKU MA840ATAKU		

HOW TO REPLACE FLAT PACKAGE IC

■ PREPARATION

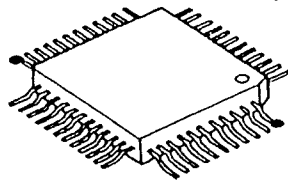
- SOLDER - - - - - Sparkle Solder 115A-1, 115B-1
OR
Almit Solder KR-19, KR-19RMA
- Soldering iron - - - - - Recommended power consumption will be between 30 W to 40 W.
Temperature of Copper Rod 662 ± 50 °F (350 ± 10°C)

(An expert may handle 60~80 W iron, but beginner might damage foil by overheating.)
- Flux - - - - - HI115 Specific gravity 0.863

(Original flux will be replaced daily.)

■ PROCEDURE

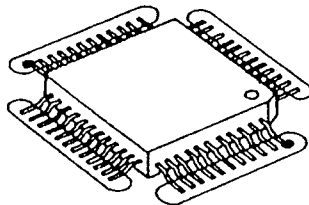
1. Temporary fix FLAT PACKAGE IC by soldering on two marked 2 pins.



● - - - - - Temporary soldering point.

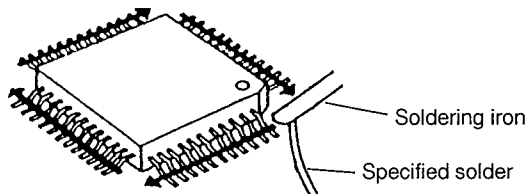
*Most important matter is accurate setting of IC to the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.



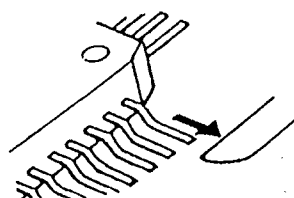
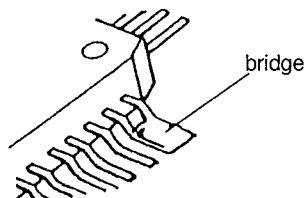
○ - - - - - Flux

3. Solder employing specified solder to direction of arrow, as sliding the soldering iron.



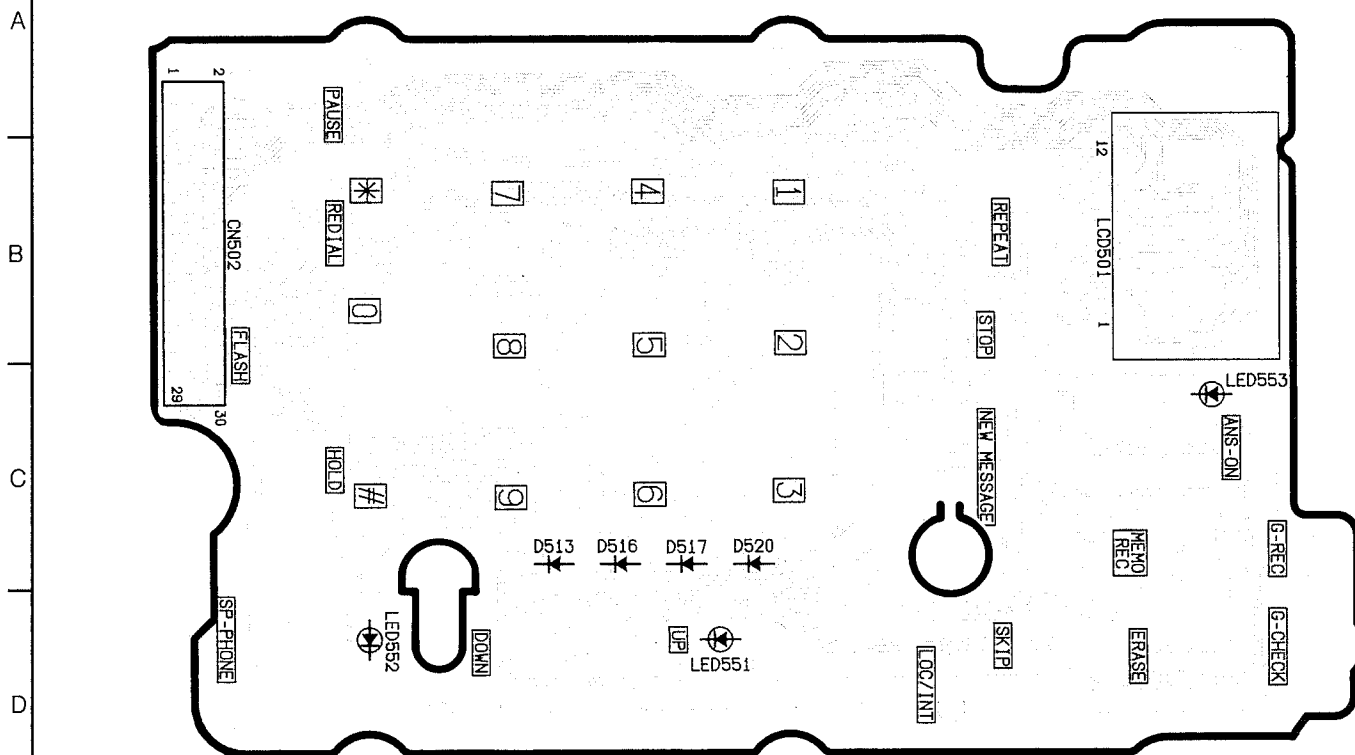
■ MODIFICATION PROCEDURE OF BRIDGE

1. Re-solder slightly on bridged portion.
2. Remove remained solder along pins employing soldering iron as shown in below figure.

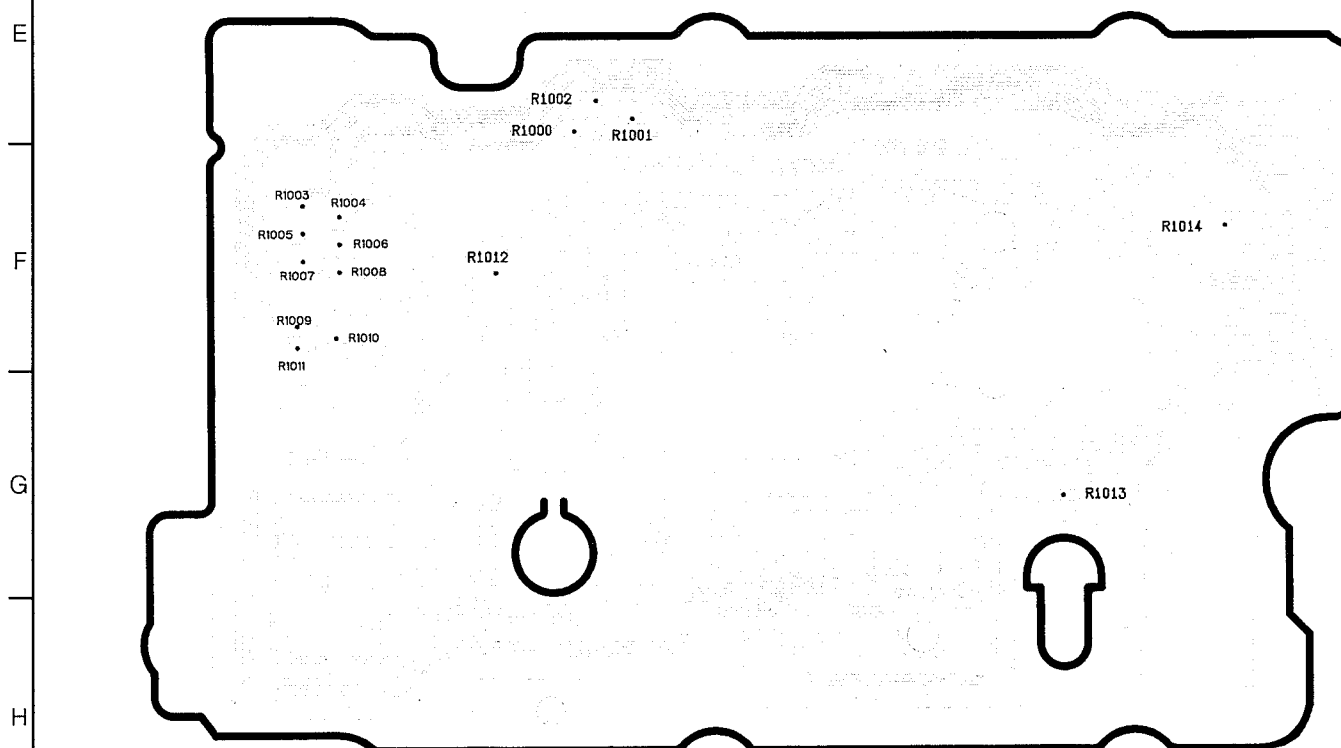


CIRCUIT BOARD (OPERATION)

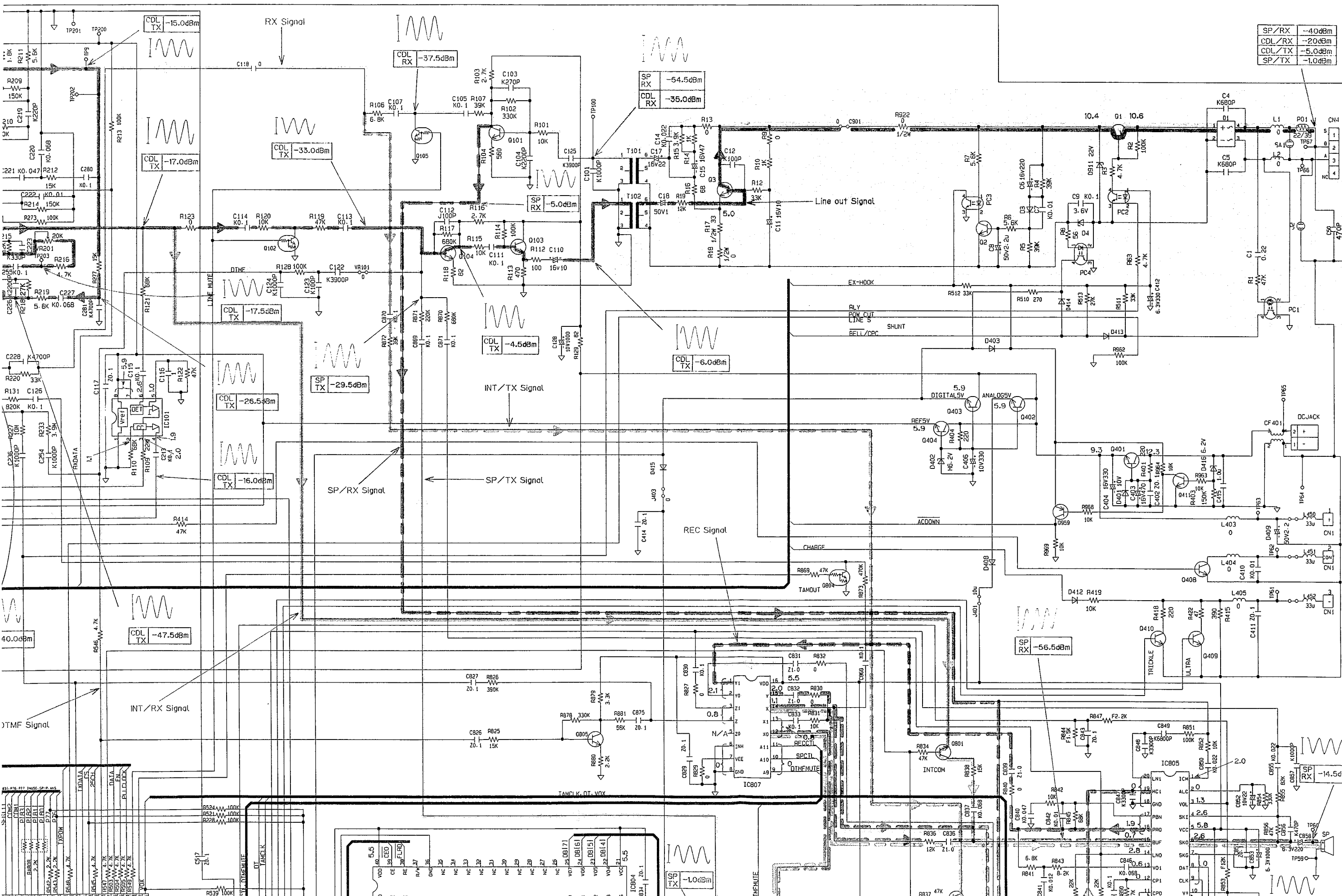
(Component View)



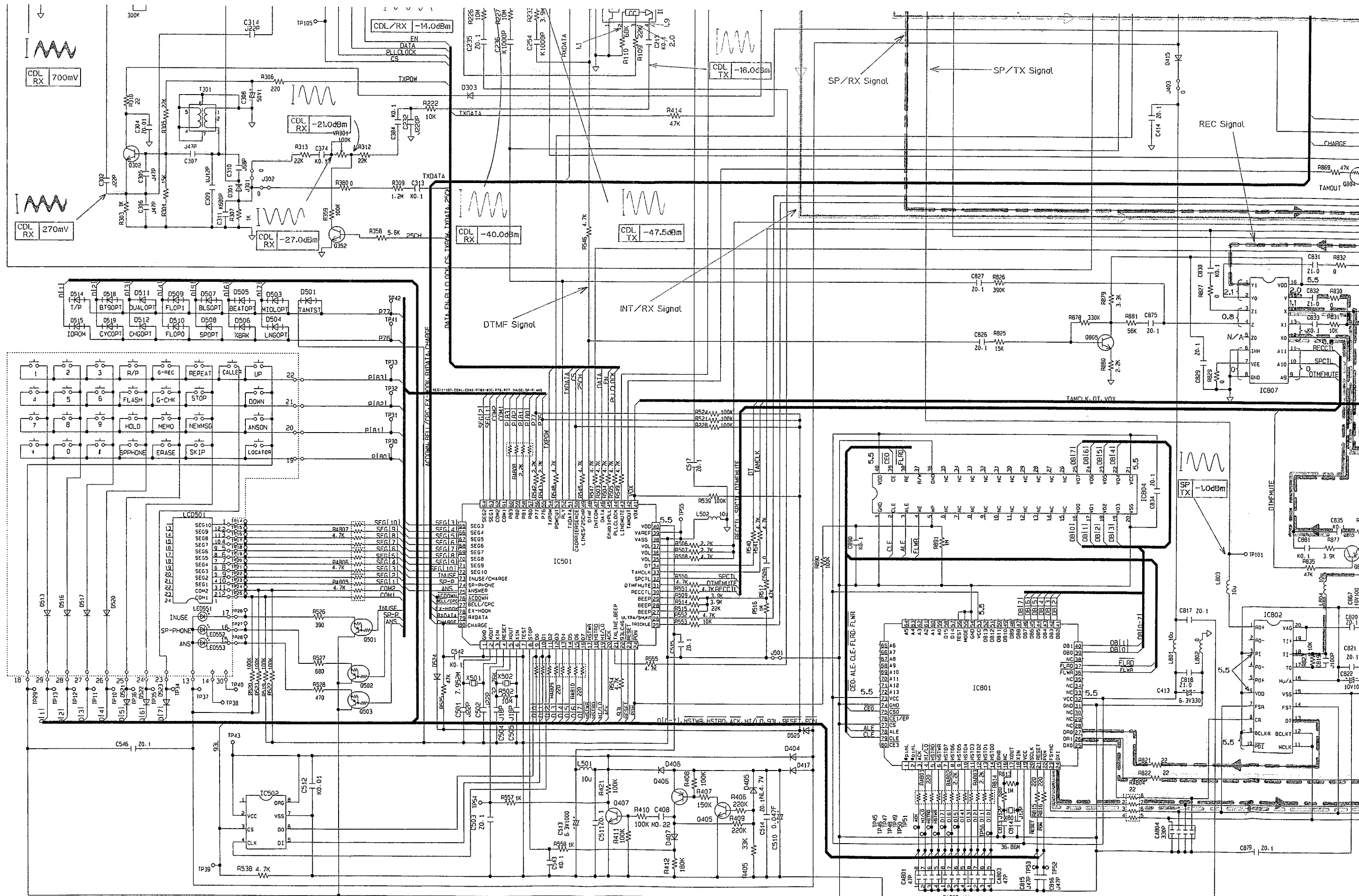
(Flow Solder Side View)



A horizontal number line with tick marks labeled from 6 to 18. The labels are placed above the tick marks.

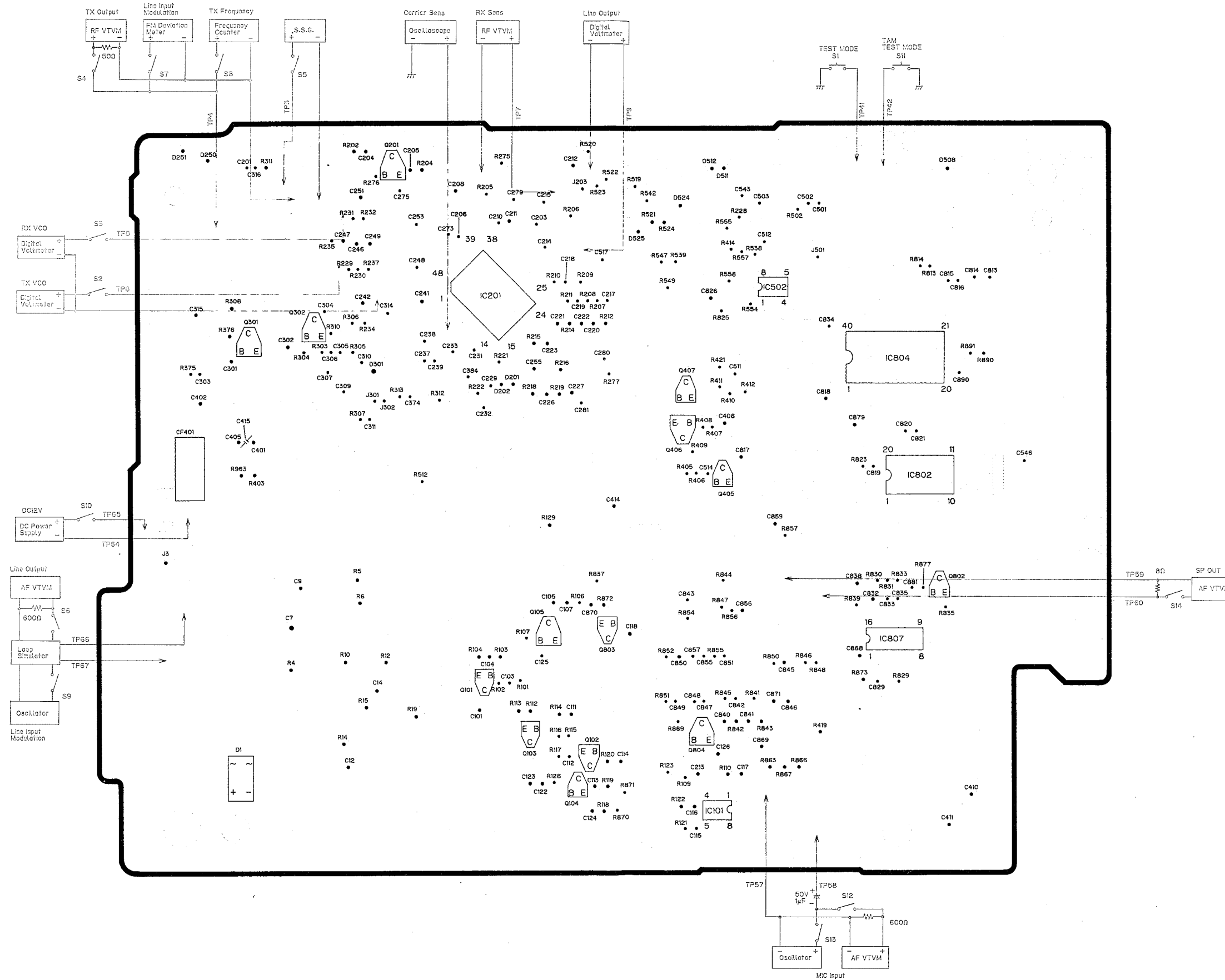


E
F
G
H
I
J
K
L
M

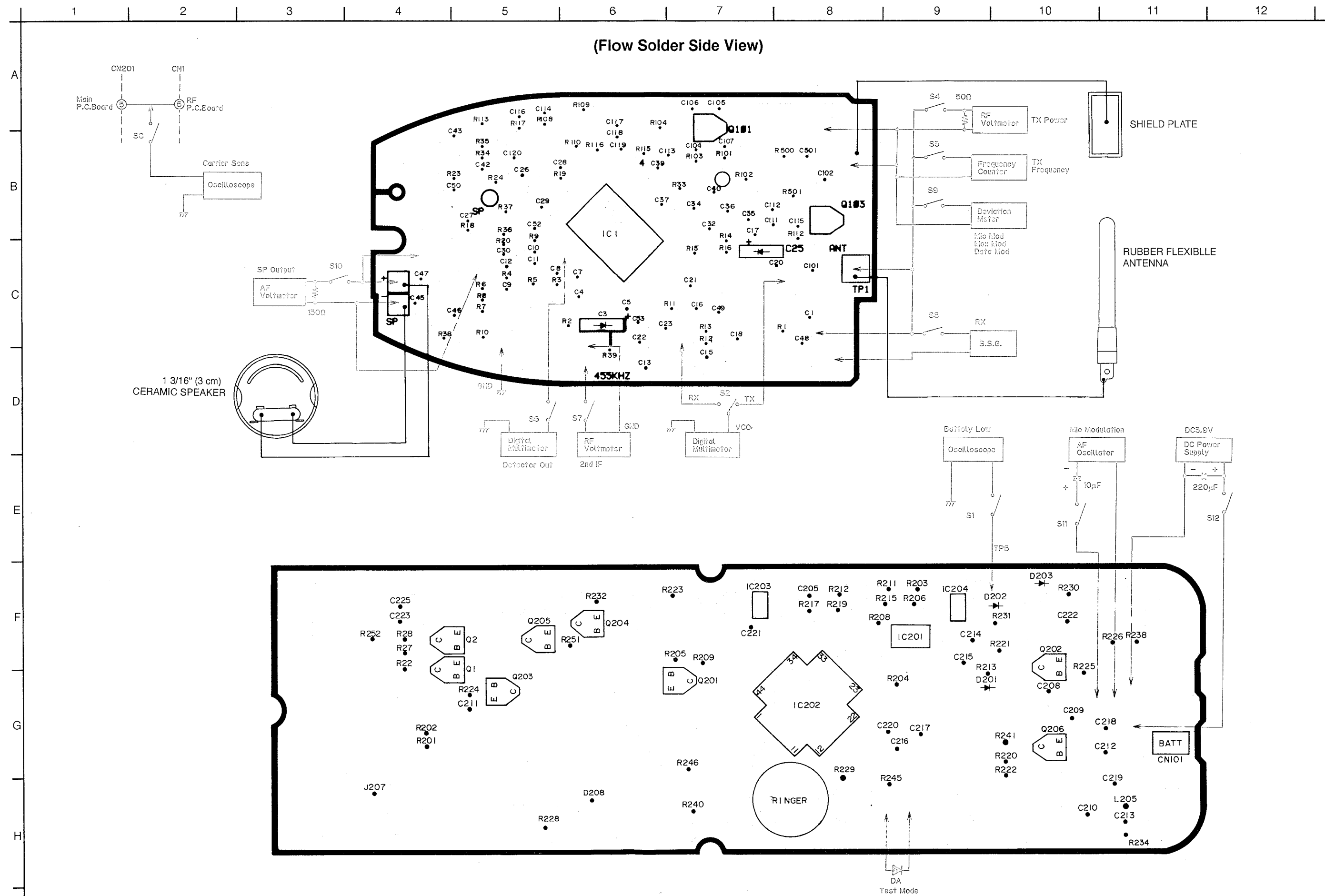


CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (BASE UNIT)

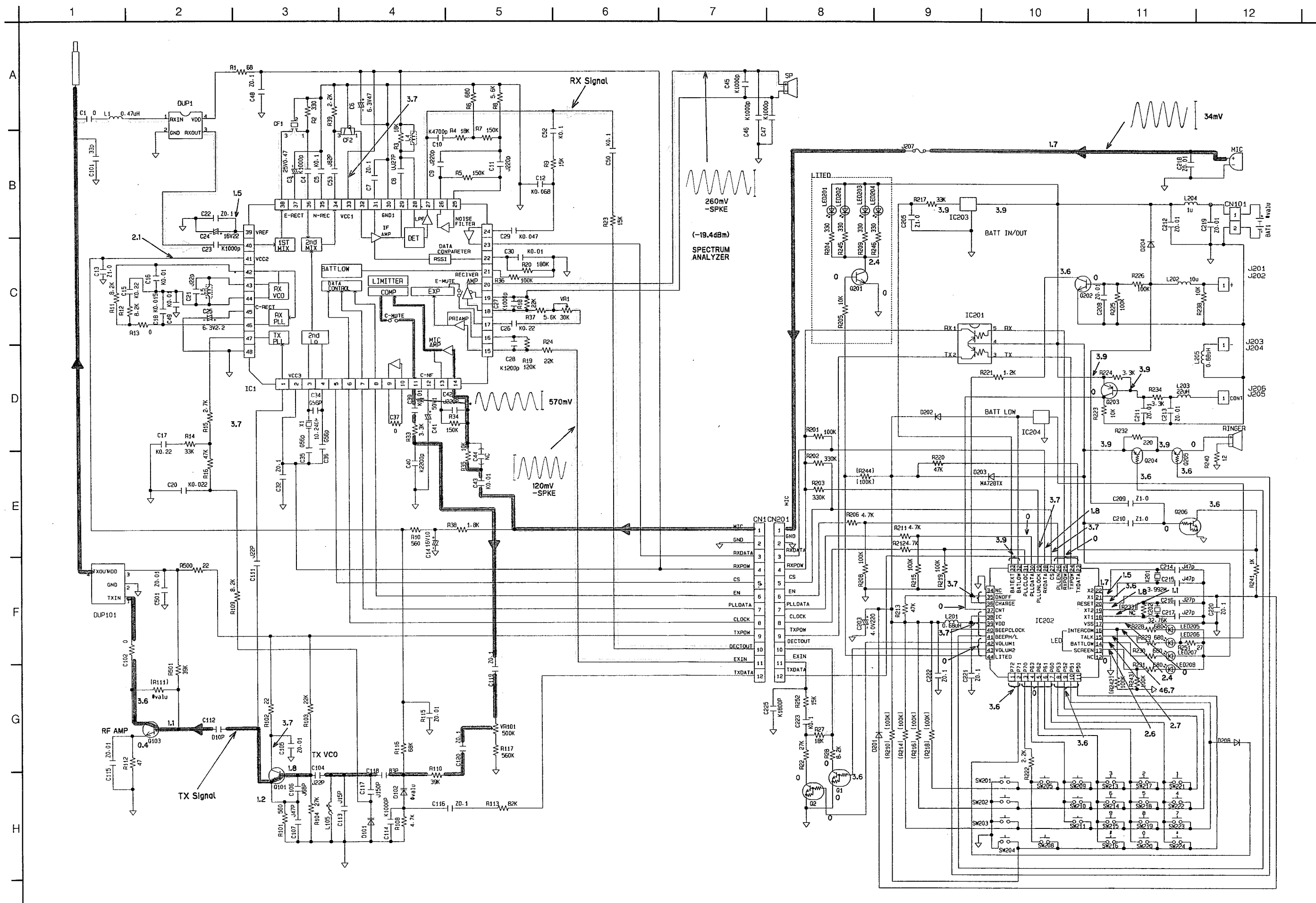
(Flow Solder Side View)



CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (PORTABLE HANDSET)



SCHEMATIC DIAGRAM (PORTABLE HANDSET)



ADJUSTMENTS (PORTABLE HANDSET)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy
The movement of Battery Low Indicator is wrong.	Make confirmation in item (A)
The base unit does not respond to a call from portable handset.	Make adjustment in item (B)
The base unit does not transmit or the transmit frequency is off.	Make adjustment in item (C)
The transmit frequency is off.	Make confirmation in item (D)
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.	Make confirmation in item (E)
The reception sensitivity of base unit is low with noise.	Make adjustment in item (F)
Does not link between base unit and portable handset.	Make confirmation in item(G), (H)
The reception level is large or small.	Make adjustment in item (I)
The transmit level is large or small.	Make adjustment in item (J)

- Unit condition:**
1. Remove the antenna lead wire from P.C Board of portable handset.
2. Connect the Main P.C.Board (CN201) and RF P.C.Board (CN1) by extension cord (PQZZ12K11Z).
3. Power Supply: DC 3.9V
4. Speaker Load: 130 Ω

How to set the test Mode

- After connecting diode DA, set S12 to ON (Power supply is turned ON).
- The unit becomes test mode (1).
- The state of the unit changes as following when "AUTO" switch is pressed.

	Test Mode	RX Freq.	TX Freq.	Mode
Power supply is turned ON	Test Mode (1)	CH25	CH25	Talk
Press "AUTO" switch 1 time	Test Mode (2)	CHA	CHA	Talk
Press "AUTO" switch 1 time	Test Mode (3)	CHB	CH1	Talk
Press "AUTO" switch 1 time	Test Mode (4)	CH1	CH1	Talk
Press "AUTO" switch 1 time	Test Mode (5)	CH1	CHB	Talk

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
IC202	(A) Battery Low Confirmation	Test Mode (1)	—	1. Set S1 to ON. 2. Set the power supply voltage to DC 3.62 V, and confirm so that the reading of oscilloscope is High. 3. Set the power supply voltage to DC 3.52 V, and confirm so that the reading of oscilloscope is Low.
IC1, X1, L105	(B) TX VCO Voltage Adjustment	Test Mode (1)	L105	1. Set S2 to TX VCO side. 2. Adjust L105 so that the reading of digital voltmeter is 3.0 V $\pm$ 0.1 V (After adjusting, set S2 to OFF).

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
IC1, X1, L5	(C) RX VCO Voltage Adjustment	Test Mode (1)	L5	1. Set S2 to RX VCO side. 2. Adjust L5 so that the reading of digital voltmeter is 1.8 V $\pm$ 0.1 V (After adjusting, set S2 to OFF).
X1, IC1	(D) TX frequency Confirmation	Test Mode (2)	—	1. Set S3 to ON. 2. Confirm that the reading of frequency counter is 49.600 MHz $\pm$ 700 Hz .
DUP101	(E) TX Output Confirmation	Test Mode (1)	—	1. Set S4 to ON. 2. Output level should be over 270~400 mV on RF VTVM (500 Ω load).
L4,DUP1	(F)RX Adjustment (Detector Output) (2nd IF Output)	Test Mode (2)	L4	1. Set S5 and S6 to ON. 2. Apply a 45 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 0 kHz) 3. Adjust L4 so that the reading of DC voltmeter 0.9 $\pm$ 0.05 V 4. Set S7 to ON. 5. Apply a 60 dB μ Vemf output from S.S.G. (modulation frequency 1kHz, dev. 0 kHz) 6. Confirm 2nd IF output so that its reading of RF VTVM is maximum output (7~20 mV).
	(G) Carrier Sensitivity Confirmation	Test Mode (2)	—	1. Set S6 and S8 to ON. 2. Apply 30 dB μ Vemf output from S.S.G.(modulation frequency 1kHz, dev. 3 kHz) signal on oscilloscope becomes low. 3. Apply 15 dB μ Vemf output from S.S.G.(modulation frequency 1kHz, dev. 3 kHz) signal on oscilloscope becomes high.
	(H) Data Moudulation Confirmation	Test Mode (2)	—	1. Set S9 to ON. 2. Keep pressing the flash button. 3. Confirm for a 4.5~6.5 kHz FM Deviation Meter reading.
VR1	(I) Speaker Output Level Adjustment	Test Mode (2)	VR1	1. Set S6 and S10 to ON. 2. Apply a 45 dB μ Vemf output from S.S.G.(modulation frequency 1kHz, dev. 3kHz). 3. Adjust VR1 so that the reading of AF VTVM is -18dBm $\pm$ 0.5 dB.
VR101	(J) MIC Modulation Factor Adjustment	Test Mode (2)	VR101	1. Set S3 and S11 to ON. 2. Apply a MIC signal (1kHz, -40 dBm at 600 Ω load). 3. Adjust VR 101 so that the reading of FM Deviation Meter is 2.8kHz $\pm$ 0.1kHz.

The connections of adjustment equipments are as shown in pages 35, 36.

■ For SCHEMATIC DIAGRAM (PORTABLE HANDSET) [Pages 37, 38]

- SW201: Talk Switch
- SW202: Auto Switch
- SW203: Intercom Switch
- SW204: ChannelSwitch
- SW205: Program/2Way Rec Switch
- SW208: Screen/Playback Switch
- SW209: Loud/Ringer Switch
- SW210: Flash Switch
- SW211: Redial/Pause Switch
- SW213~224: Dialing Switch
- DC voltage measurements are taken with electronic voltmeter from negative voltage line. (Talk Posittion)

This schematic diagram may be modified at any time with the development of new technology.

RF SPECIFICATION

BASE UNIT

Item	Value	Refer to —.	Remarks
TX Frequency	44.100 MHz $\pm$ 500 Hz	Page 18 (C)	
TX Power	270 mV $\pm$ 10mV	Page 19 (D)	
Line Modulation factor	3.8 kHz~4.2 kHz	——	Input signal from Tel line: -20 dBm/600 Ω , f=1.0 kHz at CHB Talk
Line Modulation Distortion	Less than 7%	——	Input signal from Tel line: -20 dBm/600 Ω , f=1.0 kHz at CHB Talk
Line Modulation factor (Max.)	4.5 kHz~7.5 kHz	——	Input signal from Tel line: 0 dBm/600 Ω , f=1.0 kHz at CHB Talk
Data Modulation factor	4.5 kHz~7.5 kHz	——	Press Locator switch at CHB Standby

PORTABLE HANDSET

Item	Value	Refer to —.	Remarks
Practical Sensitivity	Less than 9 dB μ V	——	at CHA Talk
Carrier Sensitivity	Less than 30 dB μ V	——	High→Low at CHB Talk
TX Frequency	49.600 MHz $\pm$ 700 Hz	Page 40 (D)	
TX Output	270 mV~400 mV	Page 40 (E)	
Data Modulation factor	4.5 kHz/dev~6.5 kHz/dev	Page 40 (H)	
MIC Modulation factor	2.7 kHz/dev~2.9 kHz/dev	——	Input signal from MIC: -40 dBm/600 Ω , f=1.0 kHz at CHA Talk

HOW TO CHECK THE PORTABLE HANDSET SPEAKER

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown in Fig.18.
- 3.

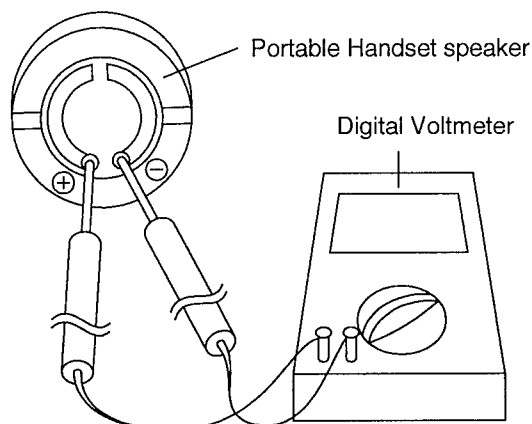
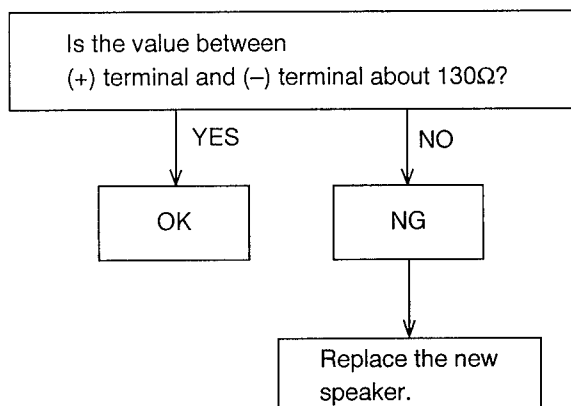


Fig. 18

EXPLANATION OF CPU DATA COMMUNICATION

1. Standby → TALK

- A. The base unit continuously scans the portable handset's TX frequencies of the 10 original channels (a). Also, the base unit scans the portable handset's TX frequencies of the 15 new channels (b), until a vacant (b) channel is found.
- a. The base unit stores the number of the vacant (b) channel, and the status of all 10 (a) channels into memory.
- [1] When the user pushes the TALK button, the portable handset sends a TALK-ACK request to the base unit. [on the portable handset's (a) TX frequency]
- [2] The base unit sends an ACK-OK to the portable handset. [on the base unit's (a) TX frequency]
- a. This ACK-OK includes the number of the 2 vacant channels.
One vacant (a) channel and the vacant (b) channel selected and stored in step Aa.
- [3] The portable handset checks the portable handset's RX frequency of the vacant (b) channel selected & stored in step Aa. If this channel is vacant, then the portable handset proceeds to step 4a. If this channel is not vacant, then the portable handset proceeds to step 4b.
- [4] a. The portable handset sends a TALK-COMMAND. This TALK-COMMAND includes the number of the vacant (b) channel selected and stored in step Aa. This TALK-COMMAND is sent on the handset's (a) TX frequency.

After sending the TALK-COMMAND, the portable handset changes to the vacant (b) channel. Then, the base unit seizes the telephone line and changes to the vacant (b) channel.

- b. The portable handset sends a TALK-COMMAND. This TALK-COMMAND includes the number of the vacant (a) channel selected in step 2a. This TALK-COMMAND is sent on the handset's (a) TX frequency.

After sending the TALK-COMMAND, the base unit seizes the telephone line. [The base unit and portable handset have been communicating on an (a) channel since step 1. Therefore they both remain on that (a) channel]

- [5] A dial tone is heard.

Notes:

All data communication between the portable handset and base unit is done on one of the (a) channels prior to completing the link in step 5.

- (a) - channels 16-25 (old) - these channels are paired, as per FCC requirements
(b) - channels 1-15 (new) - these channels are paired, as per the manufacturer's choice

OUTGOING CALL MODE (STANDBY → TALK):

- ex) Base Unit : Select channel (b) is vacant ①
 Portable Handset : Select channel (b) is vacant ②

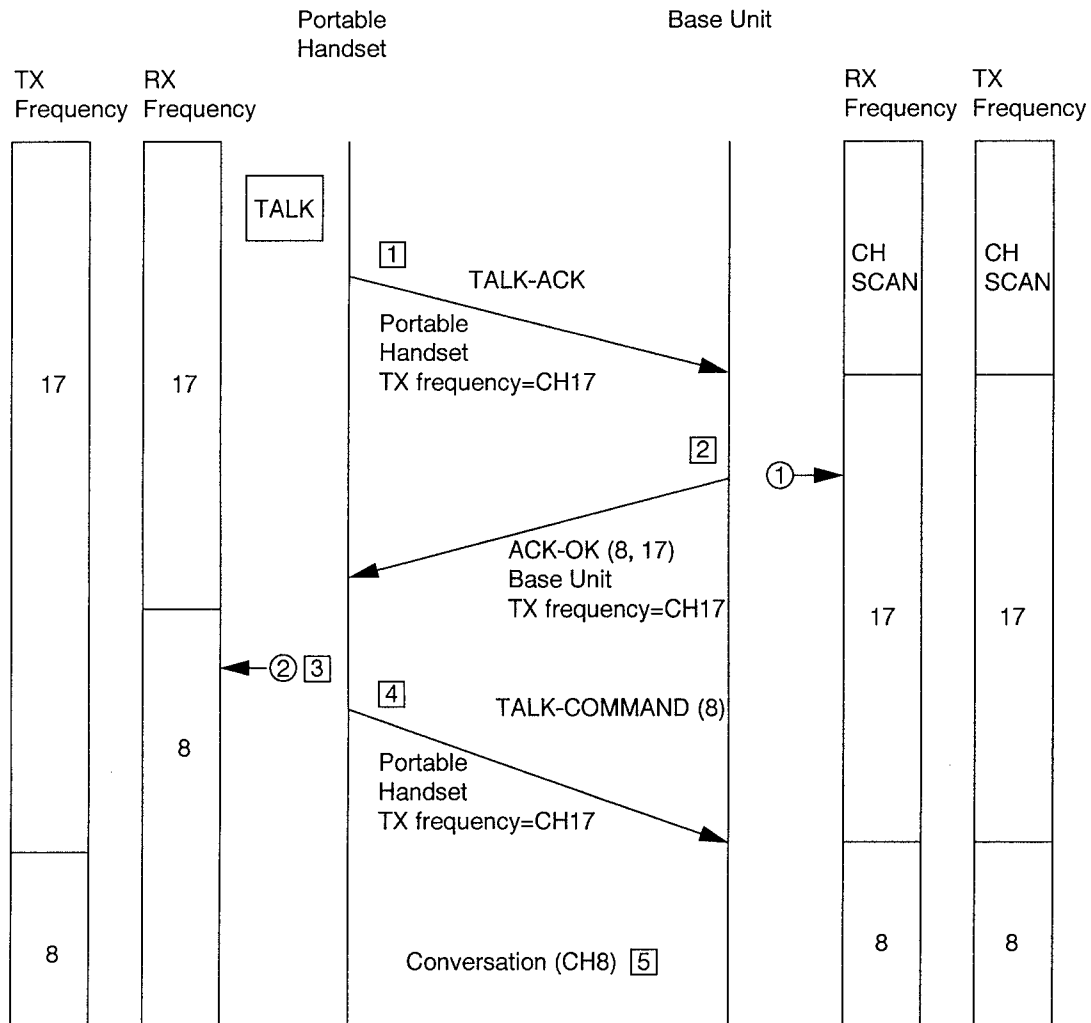


Fig. 19

- ① When the base unit is scanning, the base unit's RX frequency CH8 is vacant.
 The base unit sends an ACK-OK, which includes the numbers 8 and 17.
- ② The portable handset checks the portable handset RX frequency CH8.
 The RX frequency CH is vacant.
 The portable handset sends TALK-COMMAND, which includes the number 8.

Note: Channel (a) 16-25
 Channel (b) 1-15 (New Channel)

KX-TCM422-B/KX-TCM422-W

OUTGOING CALL MODE (STANDBY → TALK):

- ex) Base Unit : Select channel (b) is vacant ①
 Portable Handset : Select channel (b) is occupied ②

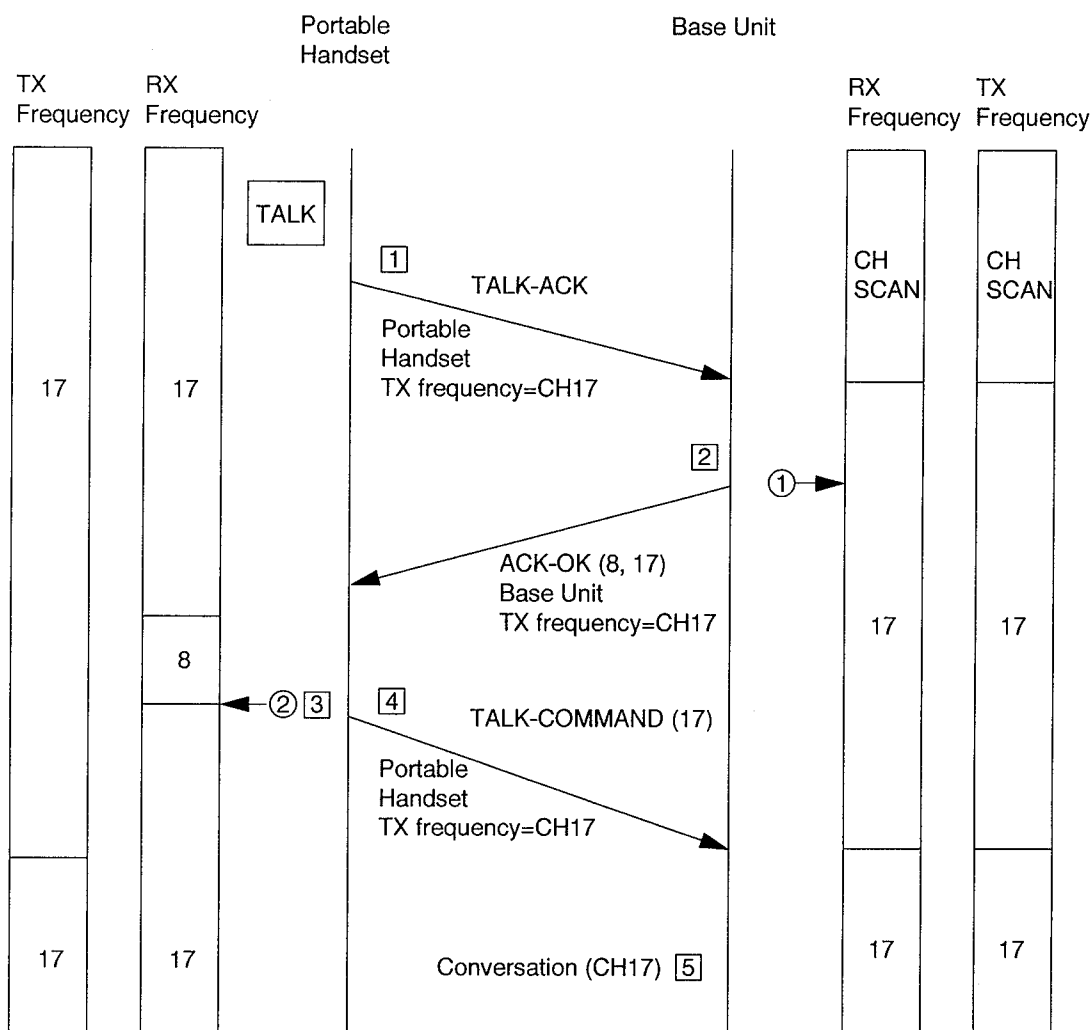


Fig. 20

- ① When the base unit is scanning, the base unit's RX frequency CH8 is vacant. The base unit sends an ACK-OK, which includes the numbers 8 and 17.
- ② The portable handset checks the handset RX frequency CH8. The portable handset RX frequency CH8 is occupied. The portable handset doesn't use CH8. The portable handset sends TALK-COMMAND, which includes the number 17.

Note: Channel (a) 16-25
 Channel (b) 1-15 (New Channel)

OUTGOING CALL MODE (STANDBY → TALK):

ex) Base Unit : All of channel (b) is occupied ①

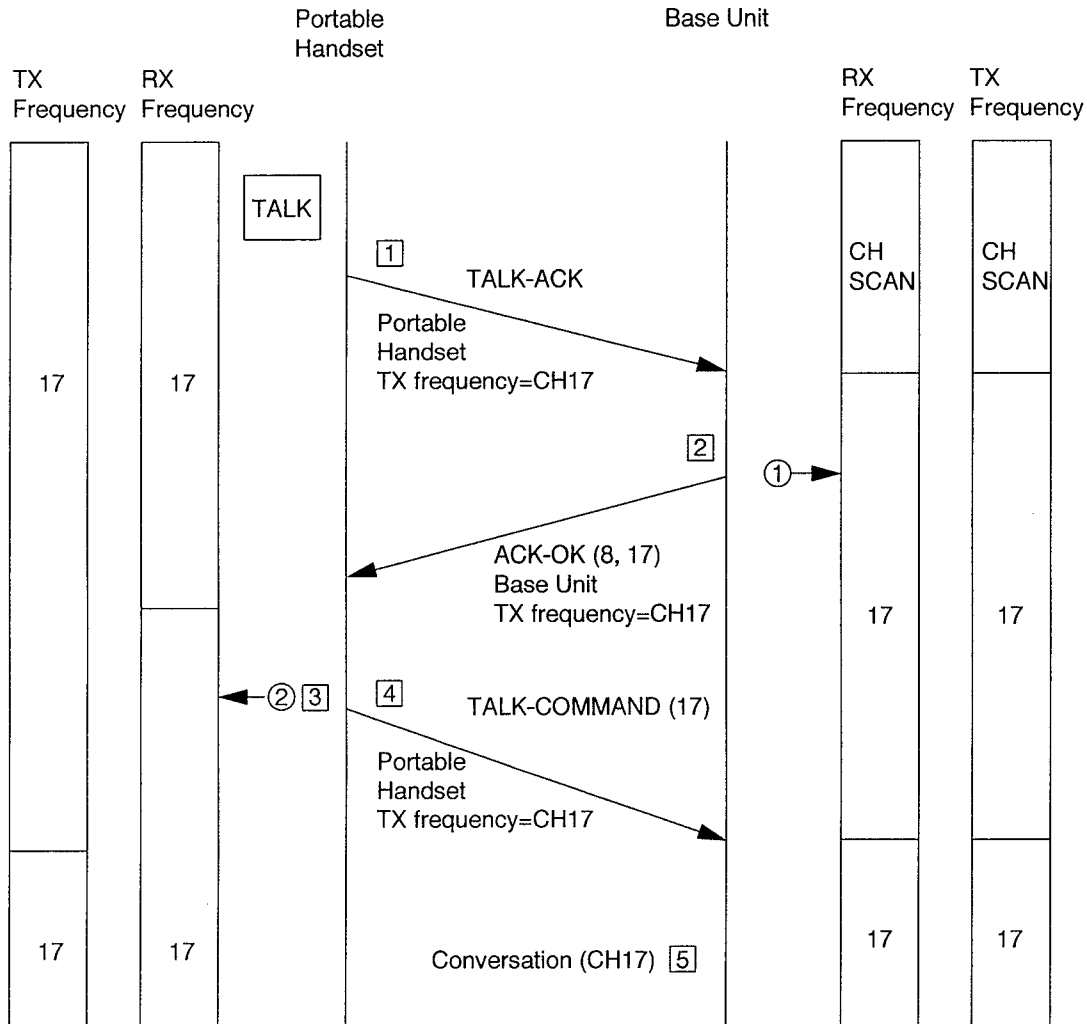


Fig. 21

- ① When the base unit is scanning, the base unit's RX frequency Channel (b) is vacant. The base unit sends an ACK-OK, which includes the number 17 only.
- ② The portable handset does not check the handset RX frequency. The portable handset sends TALK-COMMAND, which includes the number 17.

Note: Channel (a) 16-25
Channel (b) 1-15 (New Channel)

KX-TCM422-B/KX-TCM422-W

CH CHANGE MODE:

ex): (CH6 → CH8)

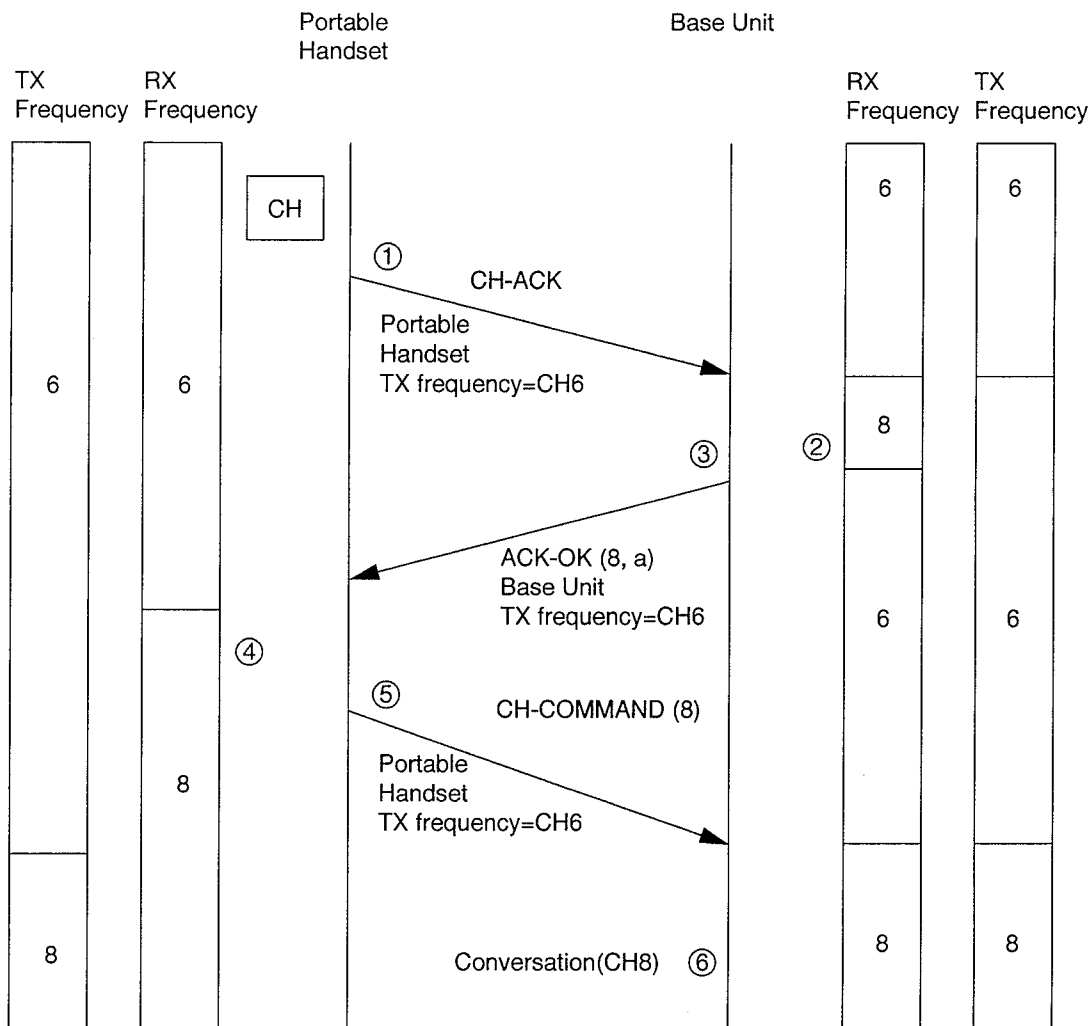


Fig. 22

- ① When the user pushes the CH button, the portable handset sends a CH-ACK request to the base unit. (on the portable handset's conversation frequency)
- ② The base unit checks the base unit's RX frequency of the vacant (b) channel selected at random.
- ③ The base unit sends a ACK-OK.
This ACK-OK includes the number of the 2 vacant channels.
One vacant (a) channel and the vacant (b) channel selected in step 2.
- ④ The portable handset checks the handset's RX frequency of the vacant (b) channel in step 2.
- ⑤ The portable handset sends a CH-COMMAND.
This CH-COMMAND includes the number of the vacant (b) channel.
After sending the CH-ACK, portable handset changes to a vacant (b) channel.
- ⑥ The base unit changes to the vacant (b) channel.
The a conversation can be accessed.

Note: (a) - Channels 16-25 (Old)
(b) - Channels 1-15 (New)

2. To terminate Communication

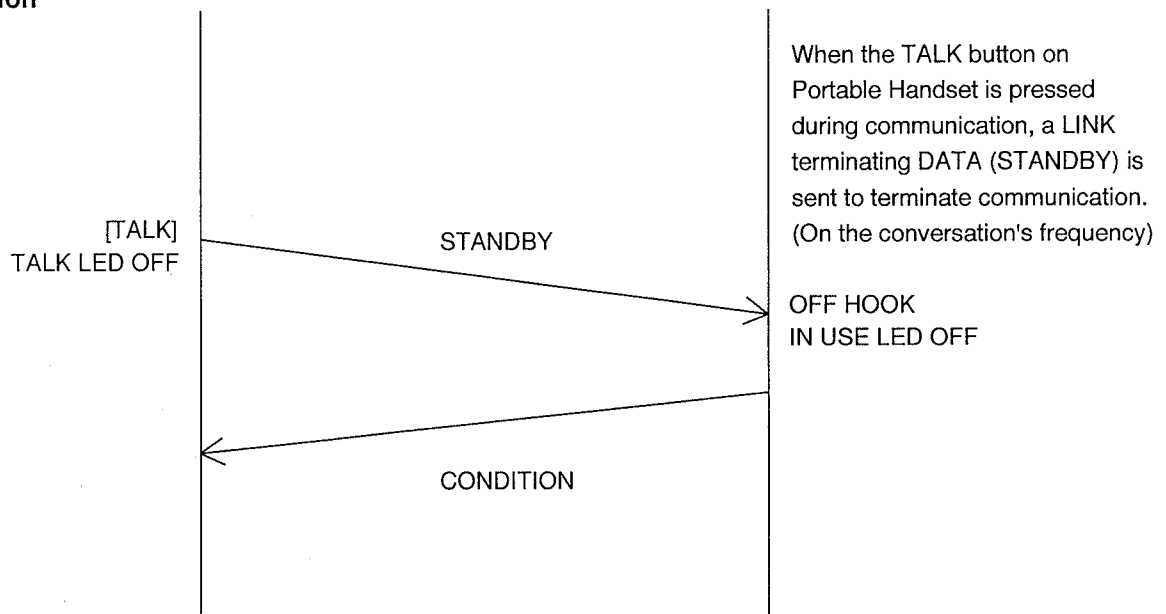


Fig. 23

3. Ringing

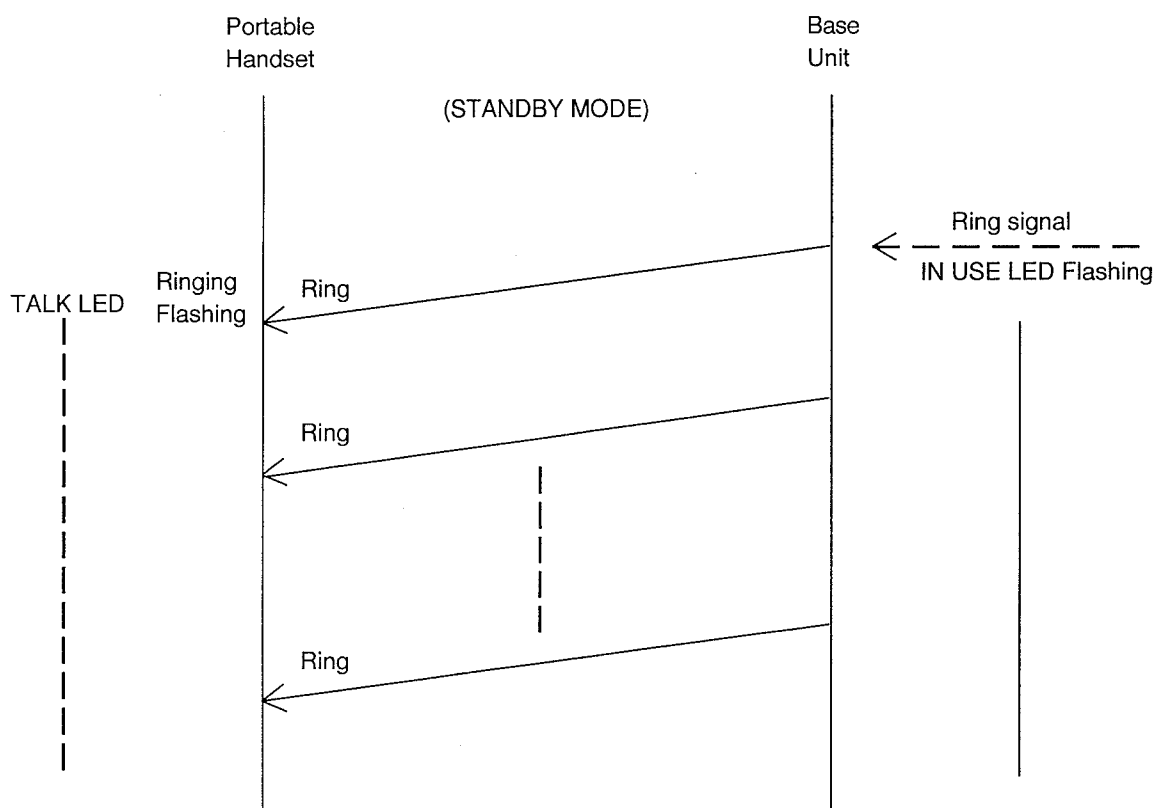


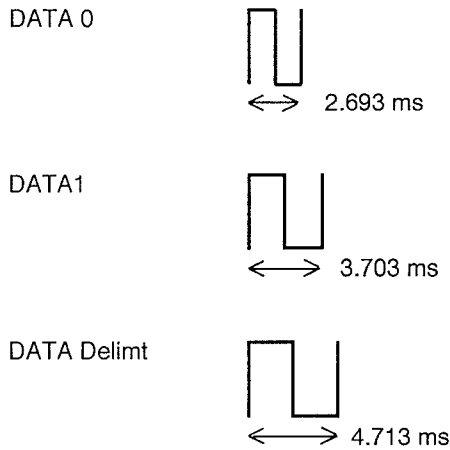
Fig. 24

After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring) on the base's (a) TX frequency, then the Portable Handset starts ringing.

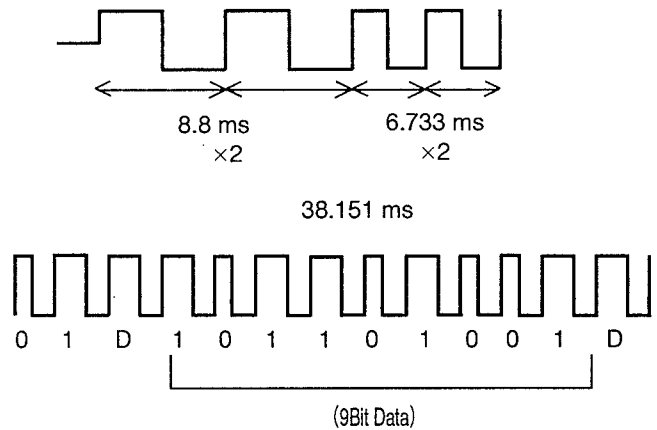
Note: (a) is channels 16-25 (old)---these channels are paired as per FCC requirements.

PORTABLE HANDSET

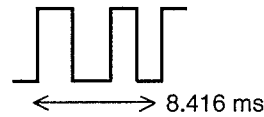
Transmitting DATA Format



Pre data

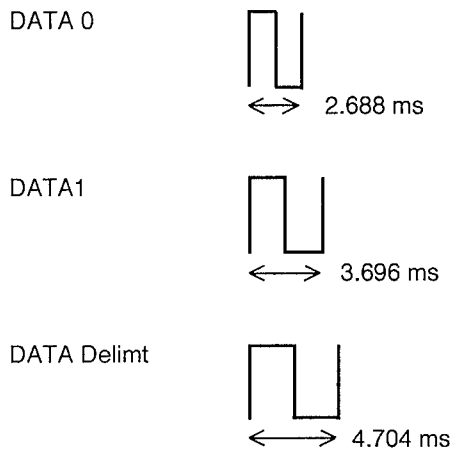


END data

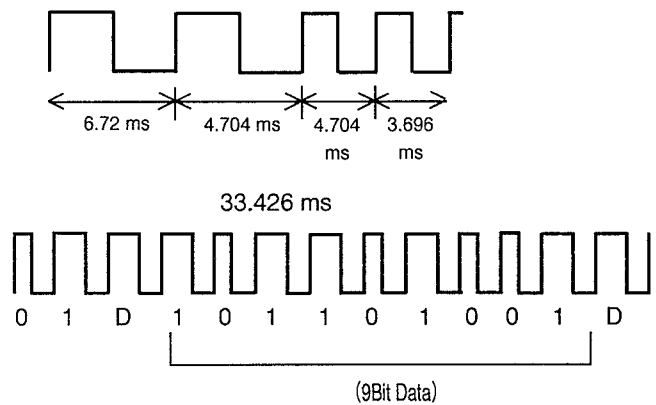


BASE UNIT

Transmitting DATA Format



Pre data



END data



6. When LINKing

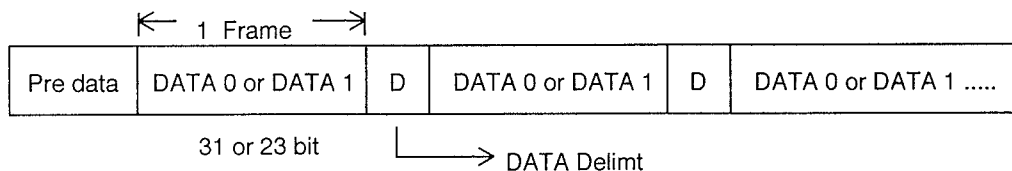


Fig. 25

When LINKing from the Portable Handset (when becoming STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA format first. Then, when LINK OK (ACK-OK) DATA is returned from the Base Unit, it is sent as LINK from DATA after changing the combination of DATA 0 and DATA 1. And the DATA

Delimt is between each Frame as a stop.

The contents of LINK requesting DATA and LINK from DATA are different depending on each operation.

7. Pulse Dial

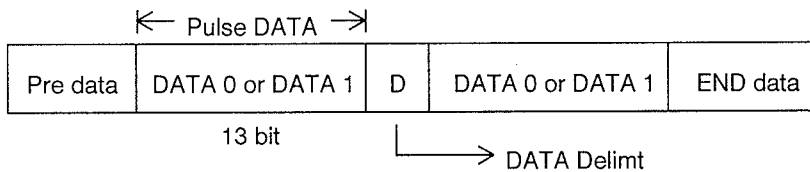


Fig. 26

When executing Pulse Dial, the Pulse Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The combination of DATA 0 and DATA 1 are changed by each Dial No. And the DATA Delimt is between each Frame as a stop. The number of Frame is 2.

8. Tone Dial

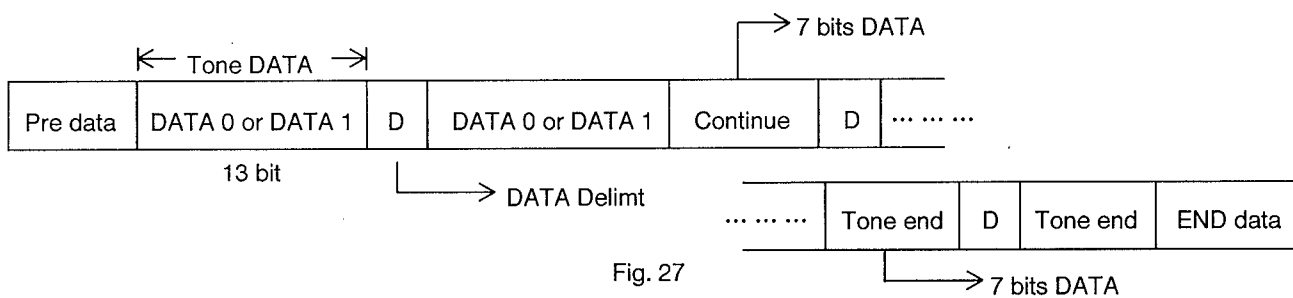


Fig. 27

When executing Tone Dial, Tone Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialing, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the TONE Dial exterminating DATA (Tone end DATA) is send, and the END data is sent finally.

NOTE

65,000 kinds of the security code are available for the model KX-TCM422-B. Each time the portable unit is set on the cradle of the base unit (for charging), the CPU automatically change the security code.

BLOCK DIAGRAM (BASE UNIT)

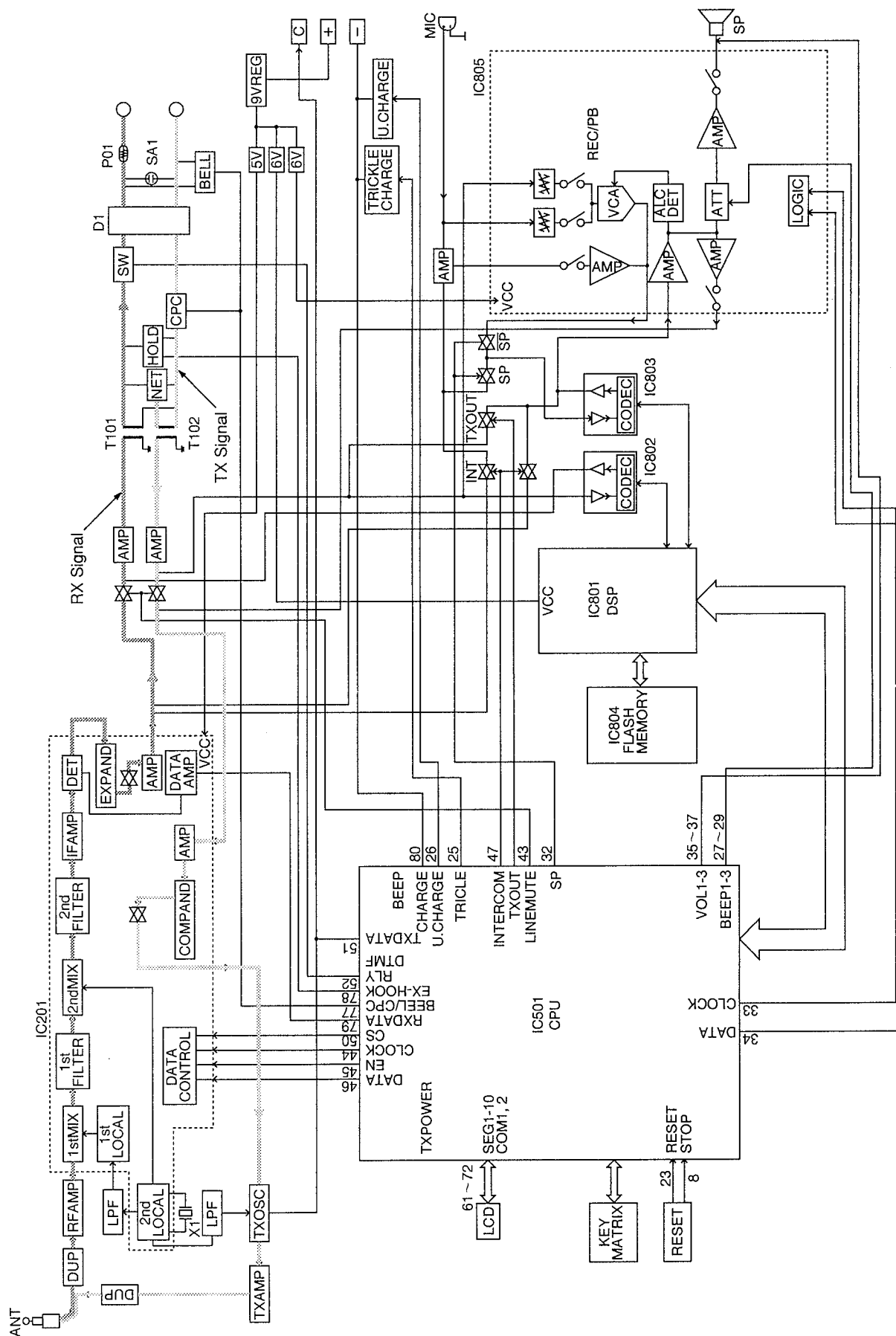


Fig. 28

- (1) CH14~CH25: The pin 49 of IC501 becomes low,so the transistor is off
- (2) CH1~CH15 : The pin 49 of IC501 becomes high,so the transistor is on;the amplitude level of the signal will be decreased (this must be done because,for this telephones modulation for CH1~CH15 becomes higher than for CH16~CH25).

— 51 —

RECEIVER RF IF CIRCUIT

Circuit Operation:

The signal of 48~49 MHz band (48.76~49.99MHz) which is input from ANT is filtered at DUP201, passes through the filter AMP of 49 MHz band at T201 and Q201, and is input to Pin 4 of IC201.

RX VCO which oscillates at T203 and Pins 42, 46 of IC201 is input to program control at inside of IC201, 1st local frequency is controlled to assigned channel by serial data which is output, from Pins 12, 13 and 28 of IC501 (CPU), makes loop with Phase Detector Out and RX VCO, and locks 1st local frequency.

The input signal of Pin 4 of IC201 and 1st local frequency output from RX VCO are mixed at inside of IC201, then it passes through CF201, and 1st IF frequency of 10.695 MHz is generated. Farther, the 10.240 MHz and 10.695 MHz which are oscillated at X201 and Pins 3, 4 of IC201 are mixed at inside of IC201 and filtered at CF202, and 2nd IF 455 Hz is output.

Circuit Diagram

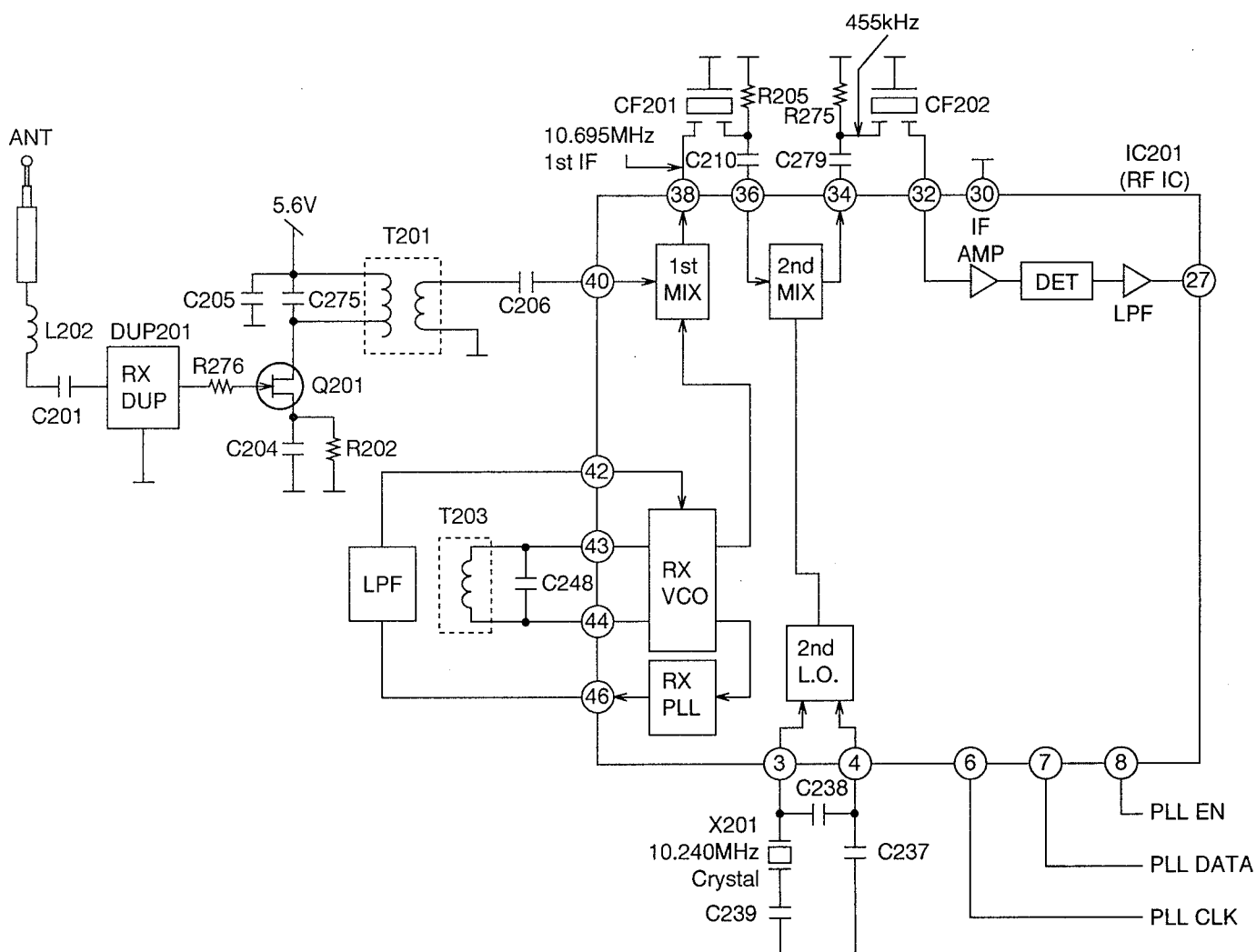


Fig. 31

RECEIVER SIGNAL CIRCUIT

Circuit Operation:

1. The detected signal passes through R277→C277→(R219) and it is input to the Pre Amplifier inside of IC201;it passes through the expander and goes out from pin 17 of IC201.
2. The signal passes through C255→VR201→R236→,and it is input to the Receiver Amplifier of IC201,on pin 18.
3. The signal is output from the amplifier on pin 20 of IC201 and it goes thru Q103 and Q104,to the telephone line.
4. The signal is also input to the IC101 (sidetone IC) in pin 6,in order to define the attenuation level of this IC.

Circuit Diagram

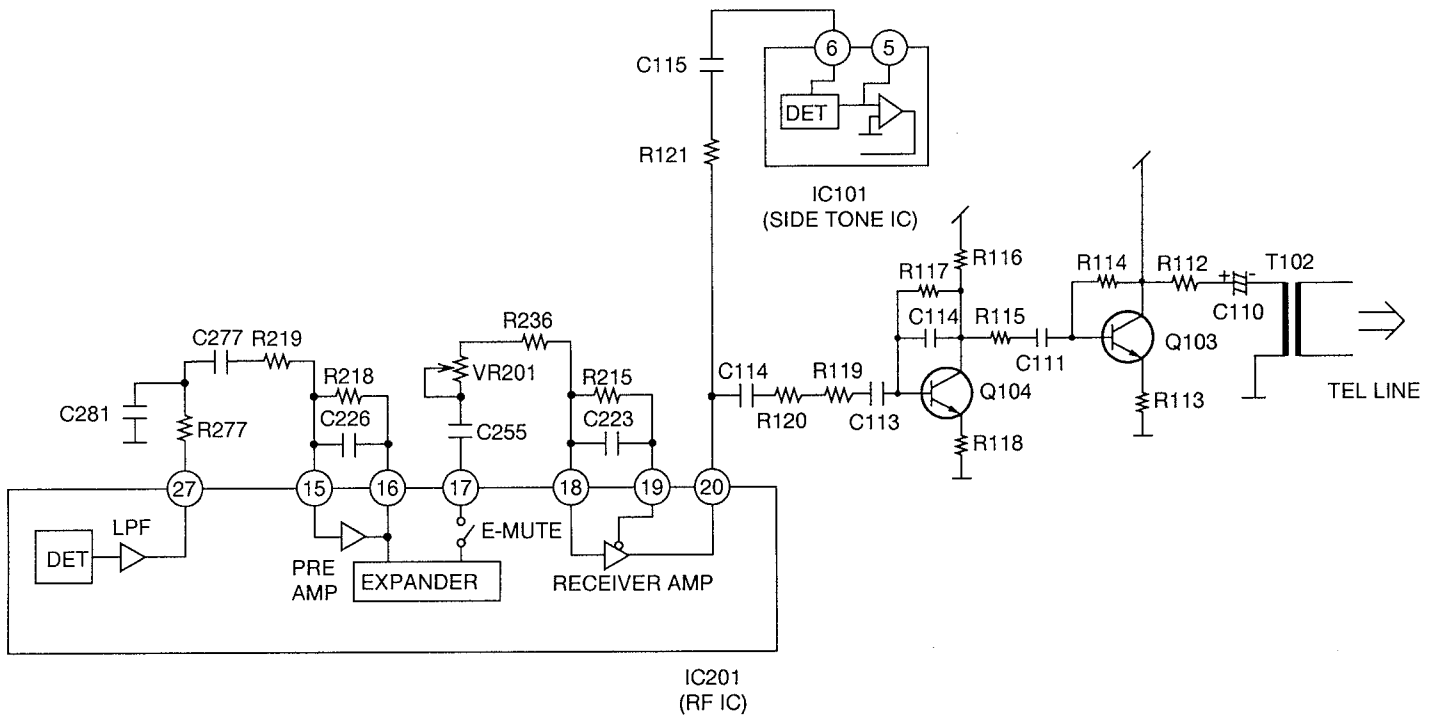


Fig. 32

KX-TCM422-B/KX-TCM422-W

SP-PHONE RX CIRCUIT

Circuit Operation:

Telephone Line → C17 → T101 → C125 → R101 → Q101 → C872 → C874 → Pin 3 of IC806 → Pin 1 of IC806 → R857 → C859 → L804 → Pin 17 of IC802 → Pin 13 of IC802 → R821 → Pin 27 of IC801 → Pin 24 of IC801 → RA804 → Pin 8 of IC803 → Pin 1 of IC803 → L806 → R833 → C835 → Pin 12 of IC807 → Pin 1 of IC807 → C839 → R840 → Pin 15 of IC805 → Pin 6 of IC805 → C858 → Speaker

Circuit Diagram

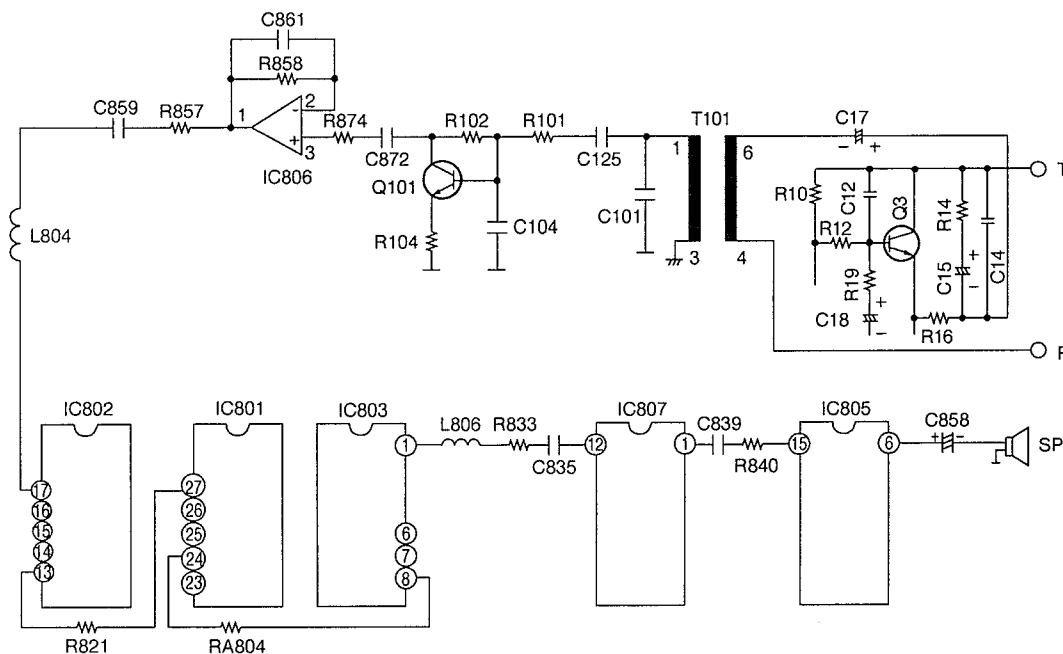


Fig. 33

SP-PHONE TX CIRCUIT

Circuit Operation:

MIC → C866 → Pin 5 of IC805 → Pin 7 of IC805 → Pin 2 of IC807 → Pin 15 of IC807 → L832 → R830 → R839 → C838 → L807 → Pin 17 of IC803 → Pin 13 of IC803 → Pin 26 of IC801 → Pin 25 of IC801 → Pin 8 of IC802 → Pin 1 of IC802 → L803 → C869 → R871 → Base of Q104 → Collector of Q104 → R115 → C111 → Base of Q103 → Emitter of Q103 → R112 → C110 → T102 → C18 → R19 → Q3 → Telephone Line

Circuit Diagram

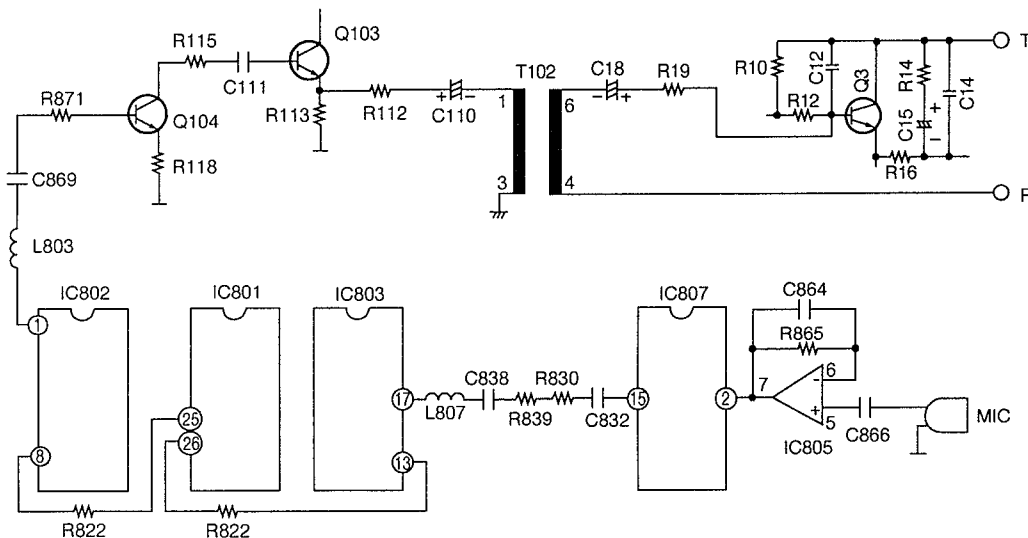


Fig. 34

NORMAL CIRCUIT OPERATION (BASE UNIT)

■ TELEPHONE LINE INTERFACE

Circuit Operation:

● ANSWER

In the idle mode, Q1 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T→PO1→C1→R1→PC1→IC501 Pin 77

When the CPU detects a ring signal, Q110 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the voice signal.

T→PO1→D1→Q1→T101 Pin 6→T101 Pin 4→D4→D1→R

● ON HOOK

Q1 is open, Q1 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

● SPECIFICATIONS

In the on-hook state (idle), the current flows between the telephone line and the unit is as follows:

T→C1→R1→PC1→R

The DC component is blocked by C1: thereby providing an on-hook condition.

The AC interface impedance is over 47 kΩ; thus, satisfying the telephone company requirements.

Circuit Diagram

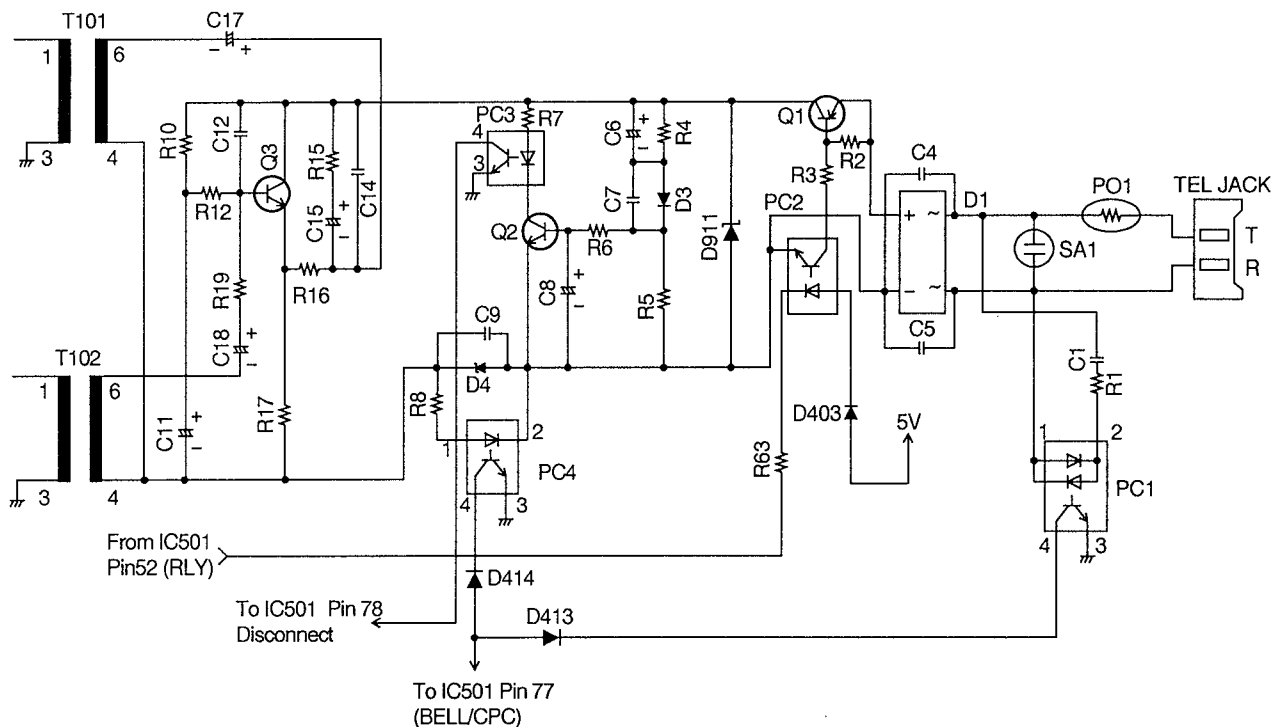


Fig. 35

KX-TCM422-B/KX-TCM422-W

■ INTERCOM MODE

- 1) When the base unit PAGE/INT button is pressed, a call monitor signal of 1.95 kHz (intercom sound) is output from Pin 37 of IC501.
- 2) At the same time, Pin 54 of IC501 goes "High", and the transmission state is reached. Then the modulated data signal is output from Pin 51 of IC501. Flashing of the INTERCOM LED (LED551) is obtained from Pin 73 of IC501. This status is called "Intercom stand-by".
- 3) The receiving signal flows:
Pin 47 of IC501 → Q801 (Pin 47 of IC501 Low → High) → R838 → C837 → Pin 15 of IC805 → Speaker.
- 4) The transmission signal flows:
MIC → IC806 (Amp) [pin 7 is outputted] → Q803 (Pin 47 of IC501 Low → High) → R872 → C870 → R94 → ANT.

■ INITIALIZING CIRCUIT

Function:

This circuit is used for to initialize the microcomputer when it incorporates an AC adaptor.

Circuit Operation:

When the AC Adaptor is inserted into the unit, then the voltage is shifted by D417 and power is supplied to the CPU.
The set can operate beyond point (A) in the circuit voltage diagram.

Circuit Diagram

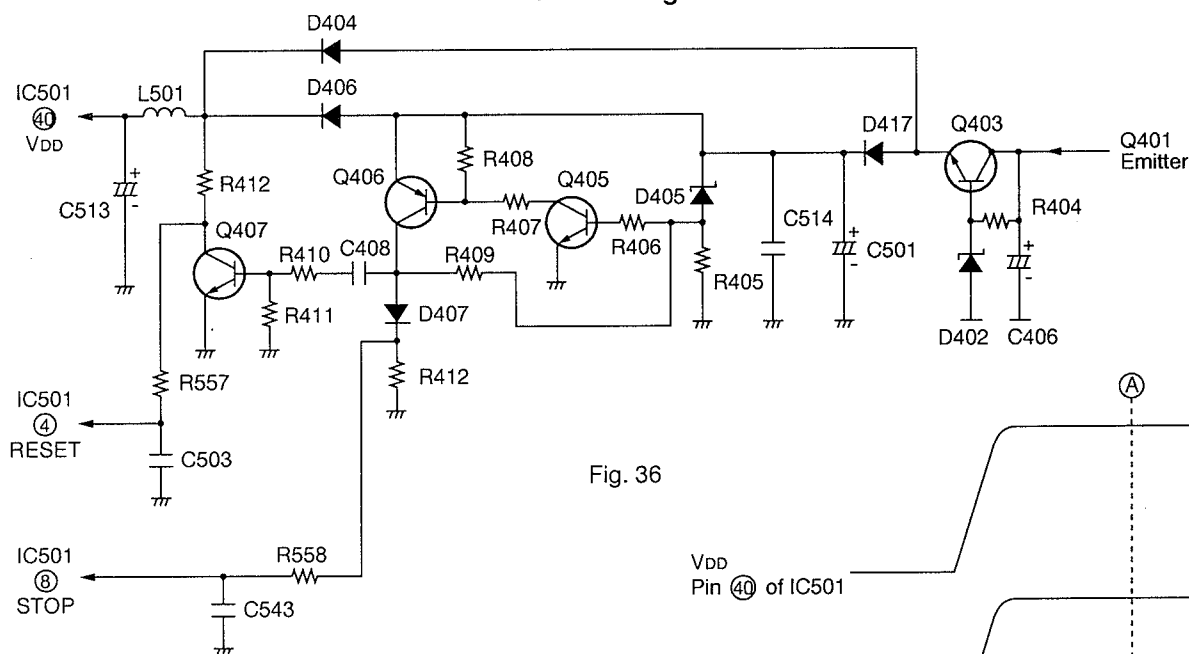


Fig. 36

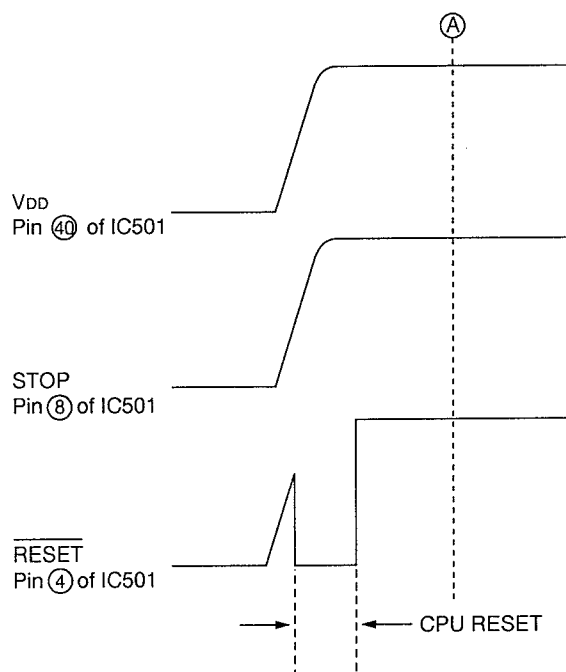


Fig. 37

■ GREETING RECORDING CIRCUIT

Circuit Operation:

MIC → R862 → C860 → Pin 19 of IC805 → Pin 16 of IC805 → R840 → C839 → Pin 1 of IC807 → Pin 15 of IC807 → R839 → C838 → L807 → Digital TAM Circuit.

Circuit Diagram

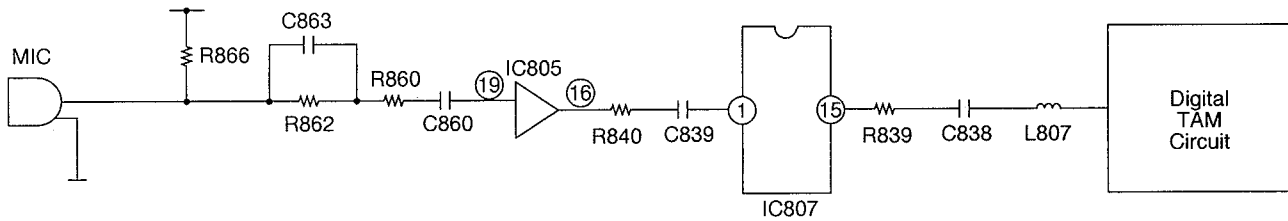


Fig. 38

■ GREETING PLAY BACK CIRCUIT

Circuit Operation:

Digital TAM Circuit → L806 → R833 → C835 → Pin 12 of IC807 → Pin 14 of IC807 → R836 → C836 → Pin 15 of IC805 → Pin 14 of IC805 → C871 → R870 → base of Q104 → collector of Q104 → Base of Q103 → emitter of Q103 → C110 → T101 → Telephone Line.

Circuit Diagram

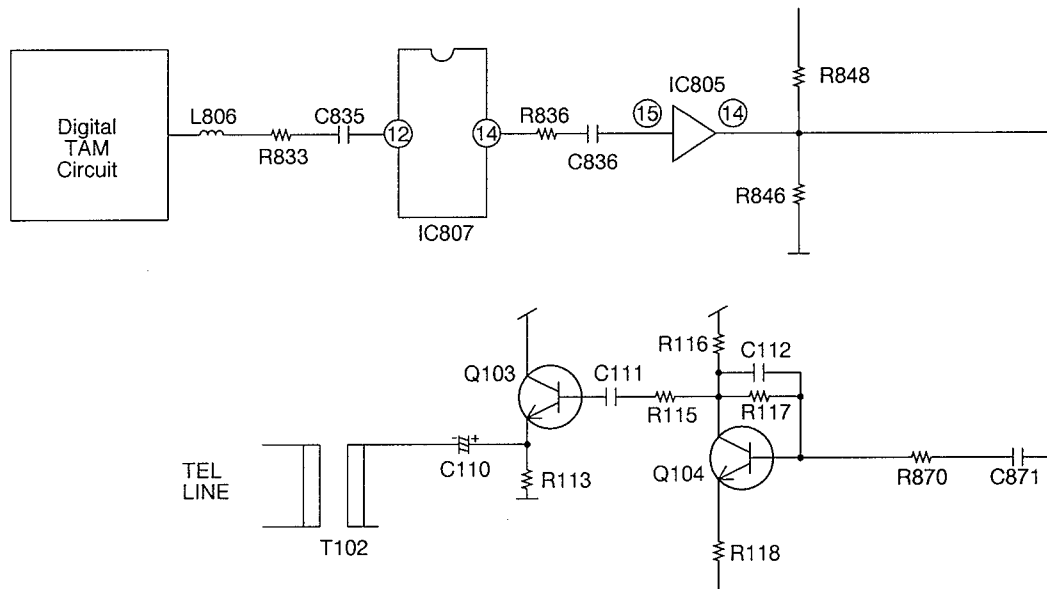


Fig. 39

KX-TCM422-B/KX-TCM422-W

ICM RECORDING CIRCUIT

Circuit Operation:

Telephone Line → T101 → C125 → R101 → Q101 → R871 → C869 → R851 → C849 → Pin 20 of IC805 → Pin 16 of IC805 → C839 → Pin 1 of IC807 → Pin 15 of IC807 → C832 → R830 → R839 → C838 → L807 → Digital TAM Circuit.

Circuit Diagram

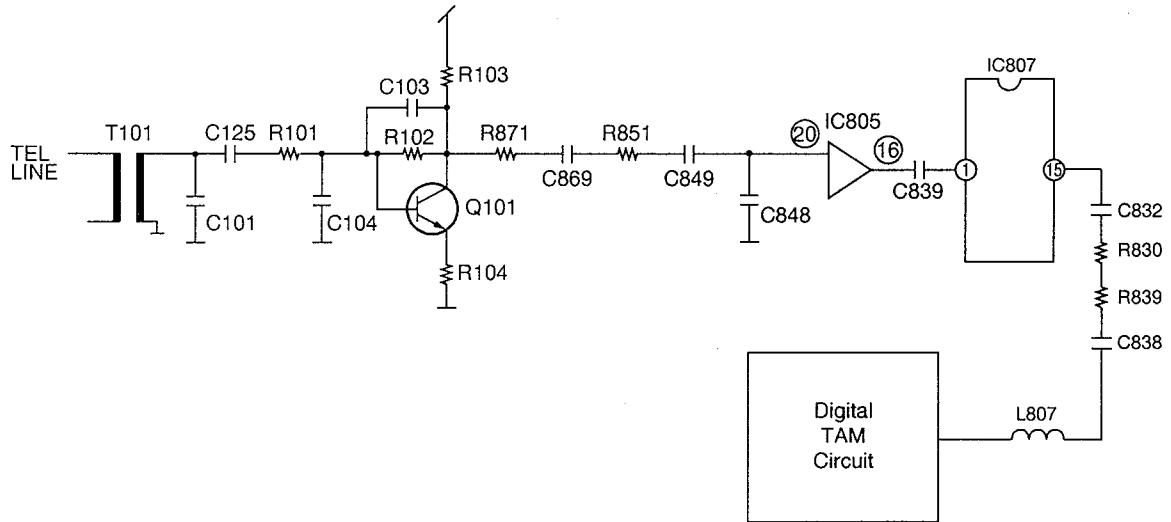


Fig. 40

ICM PLAY CIRCUIT

Circuit Operation:

Digital TAM Circuit → L806 → R833 → C835 → Pin 12 of IC807 → Pin 14 of IC807 → R836 → C836 → Pin 15 of IC805 → Pin 6 of IC101 → C858 → Speaker.

Circuit Diagram

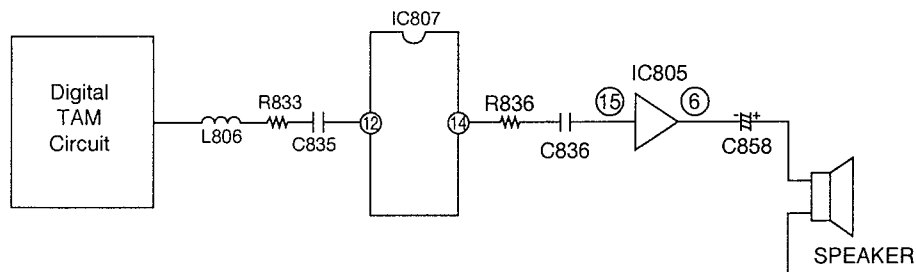


Fig.41

■ AUTO DISCONNECT CIRCUIT

Function:

This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.

Circuit Operation:

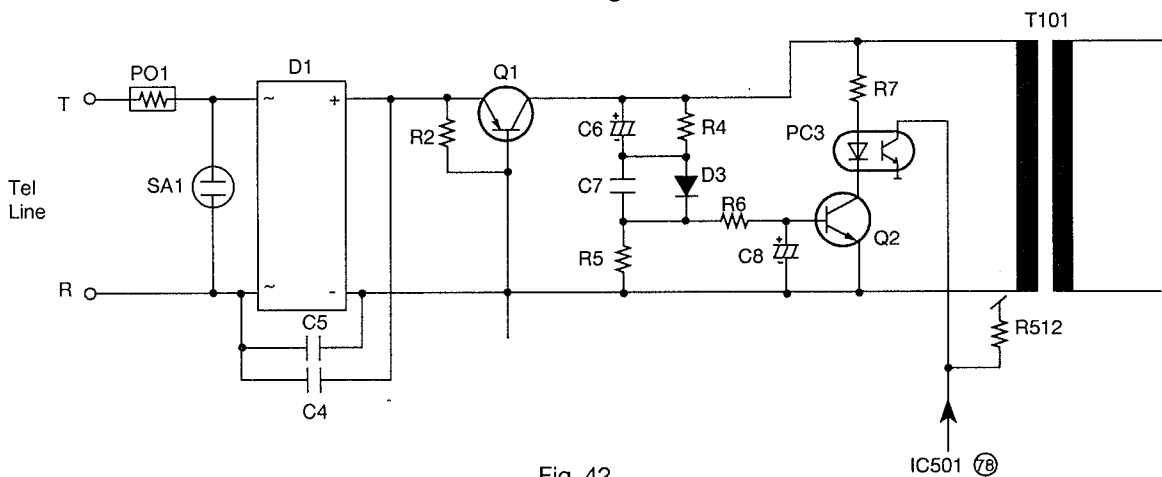
T → PO1 → D1 → Q1 → R4 → D3 → R6 → Q2. During this interval C8 charges and the base of Q1 becomes High, causing Q1 to go ON.

If a parallel-connected telephone is put into an OFF HOOK status, charge ceases to flow to C6, and the base of Q1 becomes Low, causing Q1 to go OFF.

However, the system is designed so that if the voltage fluctuation is small, the charging and discharging of C8 has no effect on the system.

When a line is connected, Q1 goes ON, causing Pin 78 of IC501 to go low. When the line is disconnected, Q1 goes off, causing Pin 78 of IC501 to go high.

Circuit Diagram



■ POWER SUPPLY CIRCUIT

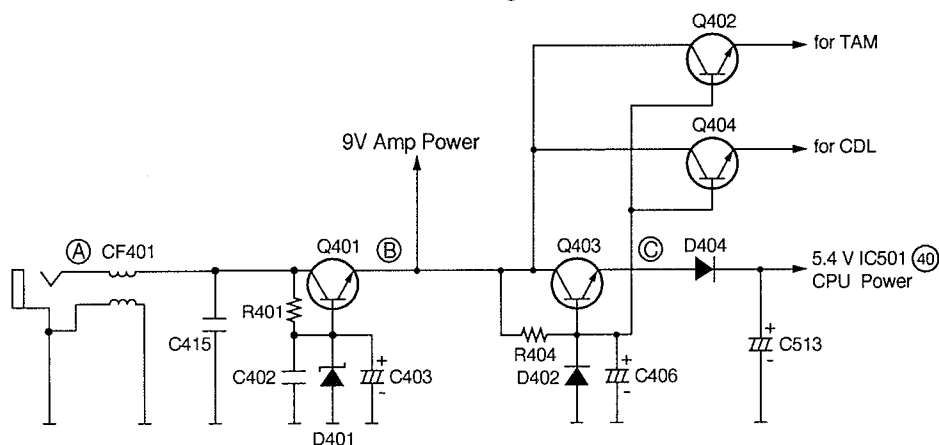
Function:

Power from the AC adaptor passes through a 2-stage regulating block consisting of Q401, Q402, Q403 and Q404 and provides system voltages of 5.4 and 9 V.

Circuit Operation:

Power from the AC adaptor is supplied directly to the plunger. Q401 is a regulated power supply. The voltage at point (B) is regulated to 9 V by the zener voltage of D401 → Amp power. Q402, Q403 and Q404 are a regulated power supply. The voltage at point (C) is regulated to 6 V by the zener voltage of D402. The 6 V voltage is dropped by D414 to 5.4 V.

Circuit Diagram



■ DSP (Digital Speech/Signal Processing) CIRCUIT**General Description:**

IC801~IC804 are a digital speakerphone/speech/signal processing system that implements all the functions of speech compression, record and playback, and memory management required in a digital telephone answering machine.

The DSP system is fully controlled by a host processor (IC501), via 8 bit interface. The host processor provides activation and control of all that functions, such as speech Recording, Playback, Tone detecting and Line Monitoring.

The DSP system comprises of following.

- a Digital Signal Processor which includes the firmware implemented functions.
- a Codec (IC802, IC803), which is used as the analog I/O interface.
- an Audio grade Flash MEM (IC804), which is used for stored voice messages, and Synthesized Voice.

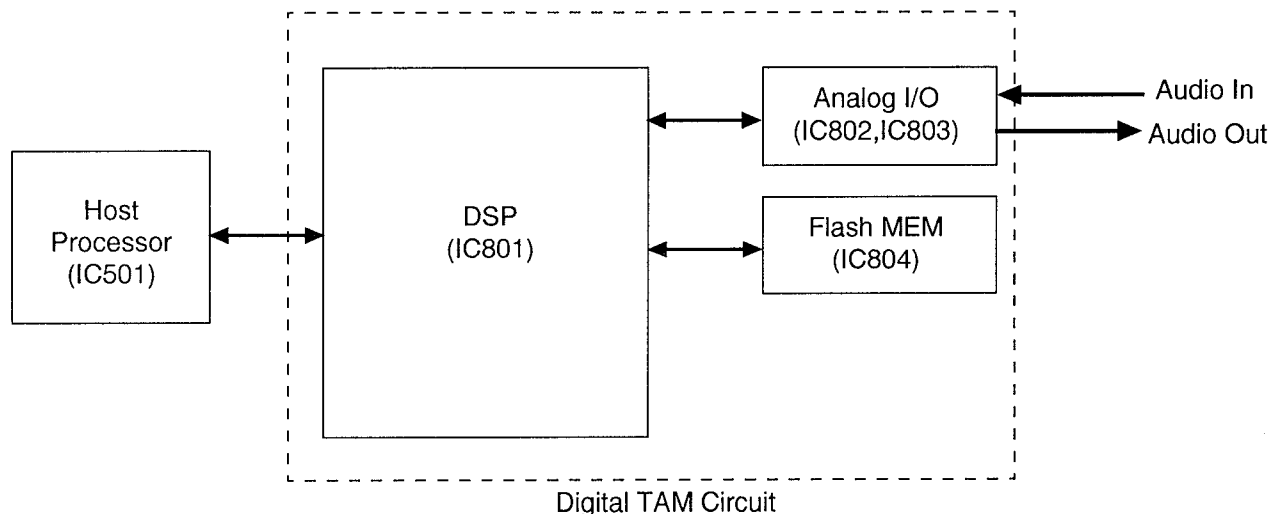


Fig. 44

. Voice Message Recording

The DSP system use a proprietary speech compression technique to record and store voice message in the Flash MEM (IC804). An error correction algorithm is used to enable playback of these messages from the Flash MEM.

. DTMF Detection

The DTMF detection is implemented by the DSP system in software. The DTMF detection is performed during Record, Playback, and Line Monitoring modes of operation.

. Synthesized Voice

The DSP implements synthesized Voice, utilizing the built in speech detector and an external Flash MEM (IC804), which stored the vocabulary.

■ CPC (CALLING PARTY CONTROL) DETECTOR CIRCUIT

Function:

The CPC DETECTOR complements the units shut off, in the ANSWER mode, after the caller hangs up. At this time, the CPC DETECTOR takes over.

The CPC DETECTOR senses the temporary disconnection of the telephone line which occurs after the caller hangs up.

Circuit Operation:

When off-hook, the DC current of telephone line flows as follows:

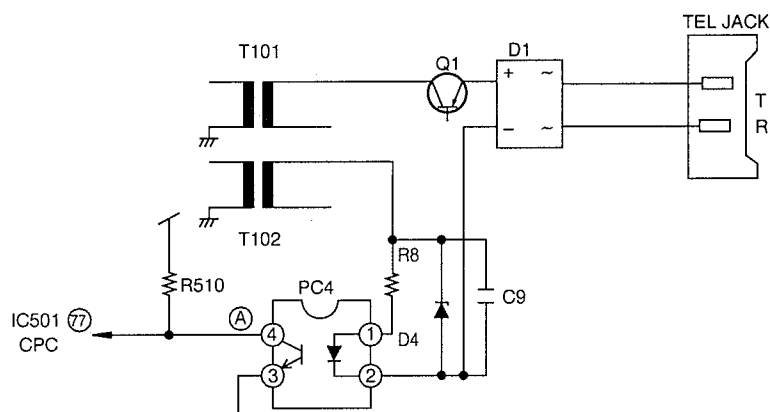
T→D1→T101→R8→PC4→D1→R

When in the off-hook mode, the collector of PC4 is at Low level.

If an instant break down of the telephone line occurs, the collector of phototransistor goes to a high level from a low level.

(The CPC detector is designed for the instant break down of more than 8 msec. or 600 msec.)

Circuit Diagram



CPC Function

	A	B
OK	more than 8 ms	more than 600 ms
NG	less than 5 ms	less than 350 ms

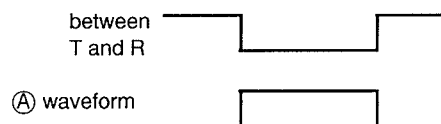


Fig. 45

CPU OPERATION

1. TEL MODE

CPU Terminals	18 TX POW	19 TX DATA	21 TR-RLY	41 BEEP
Operation Mode				
STANDBY	L	H	H	L
TALK	H	H	L	L
Portable Handset→Base Unit Paging	H	DATA OUTPUT	H	
Base Unit→Portable Handset Ring	H	DATA	H	L
Base Unit→Portable Handset Paging	H	DATA	H	
CHARGE	L	DATA	H	L
CH Changing (TALK)	H	DATA	L	L

The base unit mode is :
 OFF : LOW
 LOW :
 HIGH :

2. TIMING OF IC501 (CPU) OUTPUT PORT WITH THE BASE UNIT IN HANDSET LOCATOR MODE

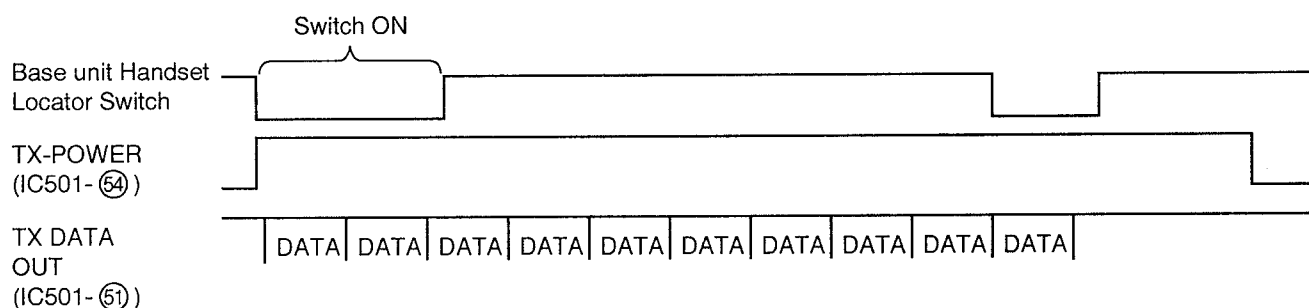


Fig. 46

3. WHEN PRESSING THE TALK BUTTON OF THE PORTABLE HANDSET

4. THE PORTABLE HANDSET TO OFF

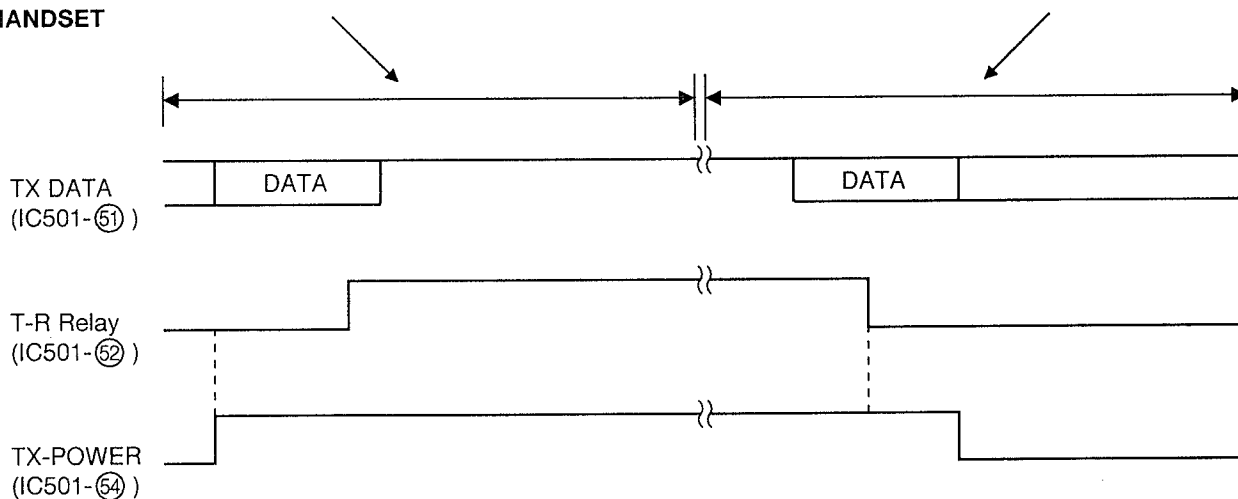
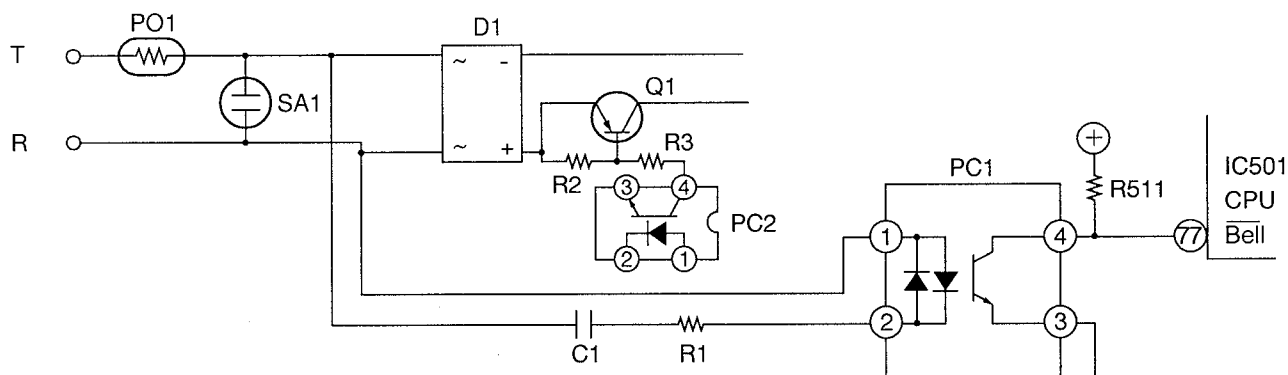


Fig. 47

4. RESONANCE PREVENTION CIRCUIT

Circuit Diagram

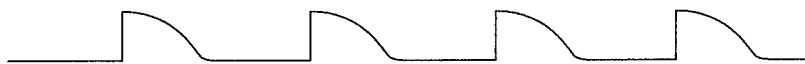


Ring signal

• T-R



• PC1-①



• PC1-④

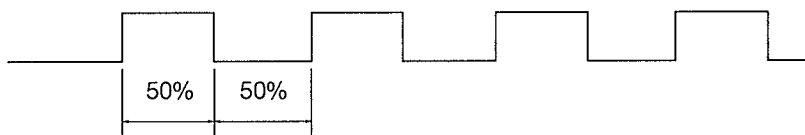


Fig. 48

Make/break ratio when dialing with the Portable handset: 40%: 60%

High/low ratio upon ring signal: 50%: 50%

Therefore, if the low/high ratio is greater than 45% at IC501- ⑦⑦ (CPU), it is judged as a ring signal.

5. EXPLANATION OF THE DATA RECEPTION CIRCUIT

5-1. Signal Flow

Circuit Diagram

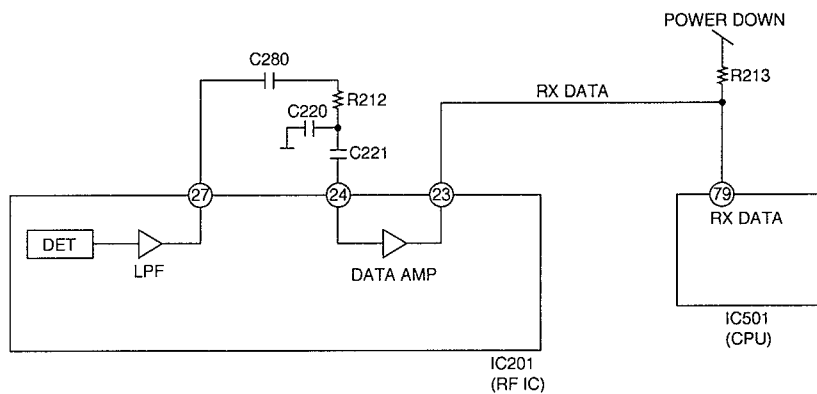


Fig. 49

In area where the transmission power from the portable handset is extremely weak, noise is superimposed on the data and the chance of an error can become extremely great upon reception of the data. To help prevent this, the above circuit is used.

BLOCK DIAGRAM (PORTABLE HANDSET)

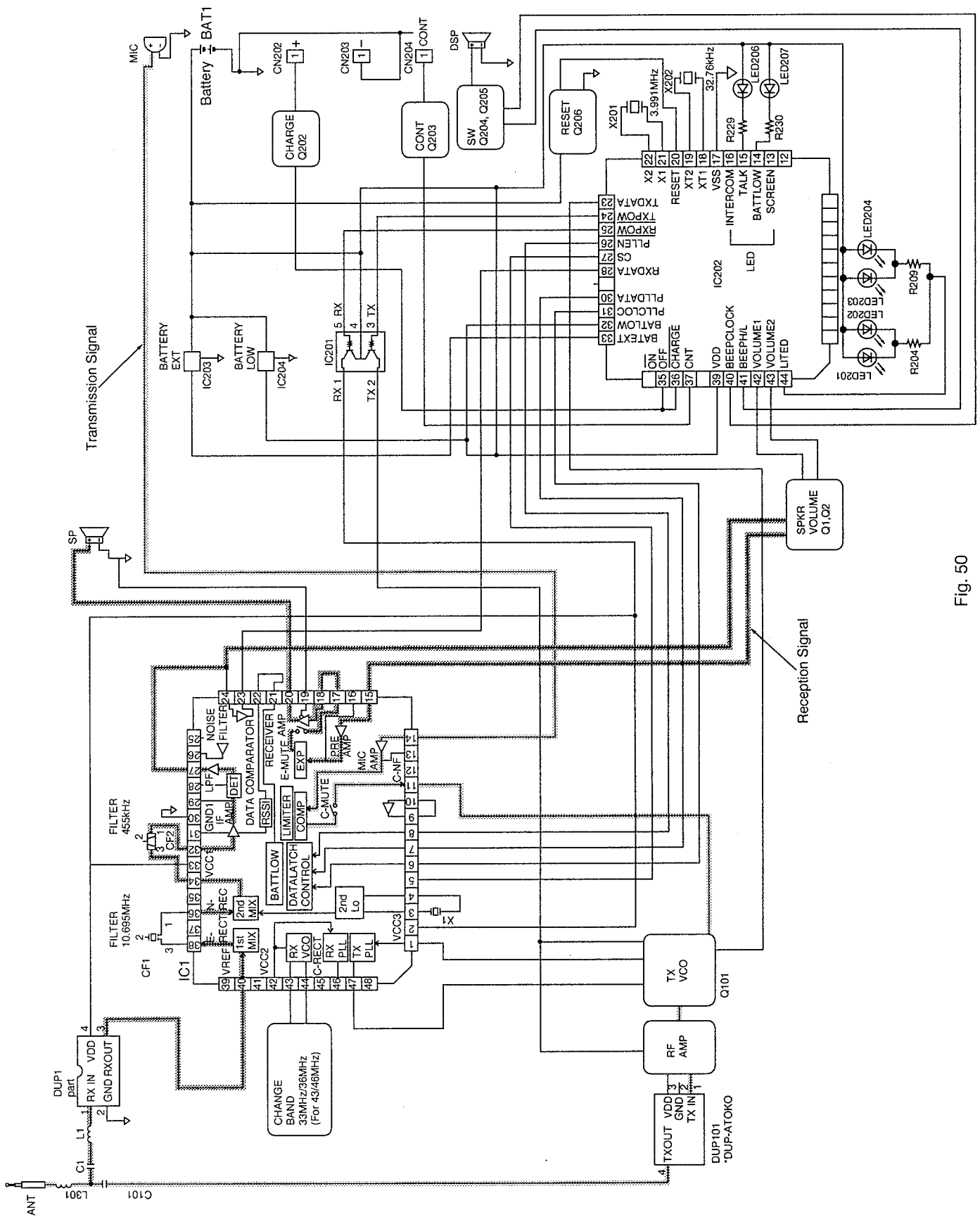


Fig. 50

NEW CIRCUIT OPERATION (PORTABLE HANDSET)

RECEIVER RF IF CIRCUIT

Circuit Operation:

The signal of 46 MHz band (46.61 MHz~46.97 MHz) which is input from ANT is filtered by DUP1, and is input to Pin 40 of IC1. The RX VCO which oscillates at L5 and IC1 is locked to 1st Local frequency by PLL inside IC1. (PLL is controlled by serial data output from Pin 26, 30 and 31 of IC202.)

An input signal from Pin 40 of IC1 and 1st Local frequency output from RX VCO are mixed inside IC1, pass through CF1, and 1st IF frequency of 10.695 MHz is generated.

Further, 10.240 MHz and 10.695 MHz oscillated at X1, pass through MIXER inside IC1 and are filtered at CF2 and output 2nd IF 455 kHz.

Circuit Diagram

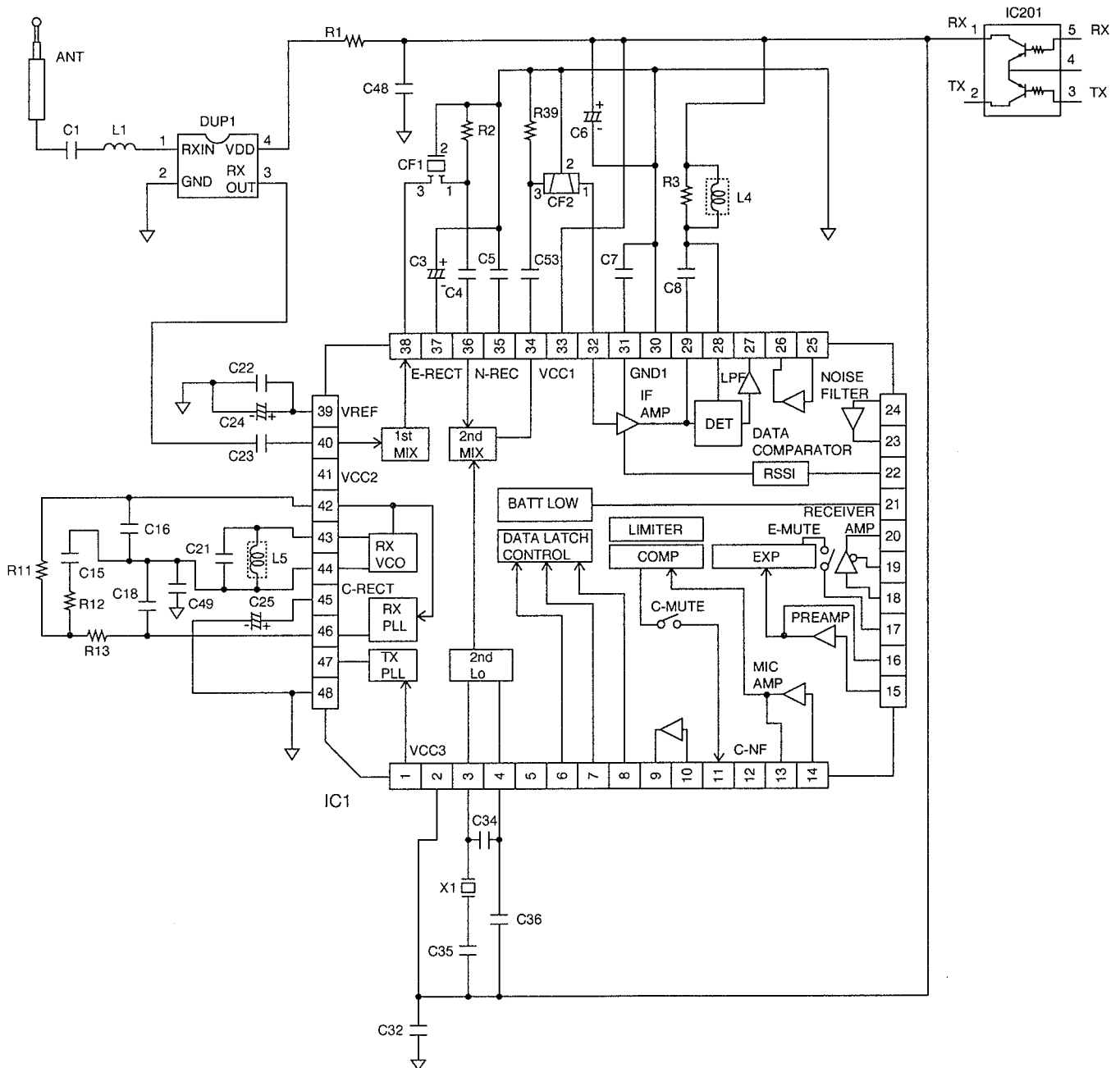


Fig. 51

RECEIVER SIGNAL CIRCUIT

After getting the 455kHz signal, it is input to Pin 32 of IC1 and passes through if AMP and Detector Circuit are output to Pin 27. It is an AF signal flows through C50, R23. Its level is switched by Q2 and Q1 which are controlled by the CPU. The signal is received at Pin 15 of IC1, then it passes through the following circuits : PRIAMP, Expander and Amplifier : It goes out at Pin 20 and finally is sent to the SP.

Inside IC1, E-MUTE, C-MUT and PLL circuits are controlled by the serial data that the CPU send from Pins 26, 31 and 32.

- 66 -

■ TRANSMITTER SIGNAL CIRCUIT

Circuit Operation:

Input signal from MIC passes through the filters arranged by C43,R35 and C42,R34 and it is input to the Pin 14 of IC1. Inside it, the signal passes through the MIC AMP and Compressor circuits and is output to Pin 11.

It flows through C39, R33, C119 and VR101, then is input to modulator circuit.

Circuit Diagram

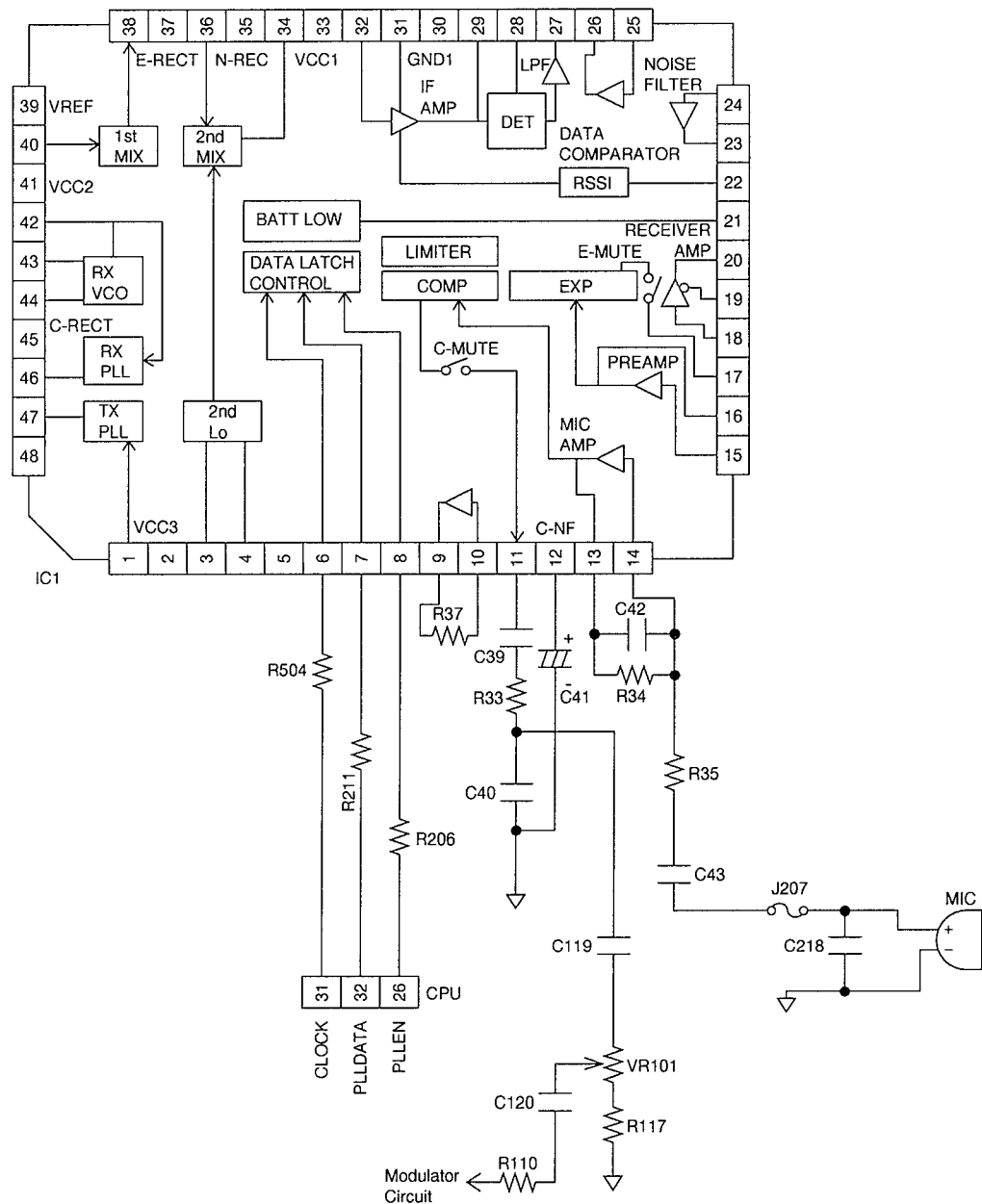


Fig. 53

RECEIVER DATA CIRCUIT

Circuit Operation

Only the data received are passed through the low pass filter conformed by R9 and C12 to be input at pin 24 of IC1, where the its wave forme is adjusted. The resulting signal is output from Pin 23 and sent to CPU directly.

Circuit Diagram

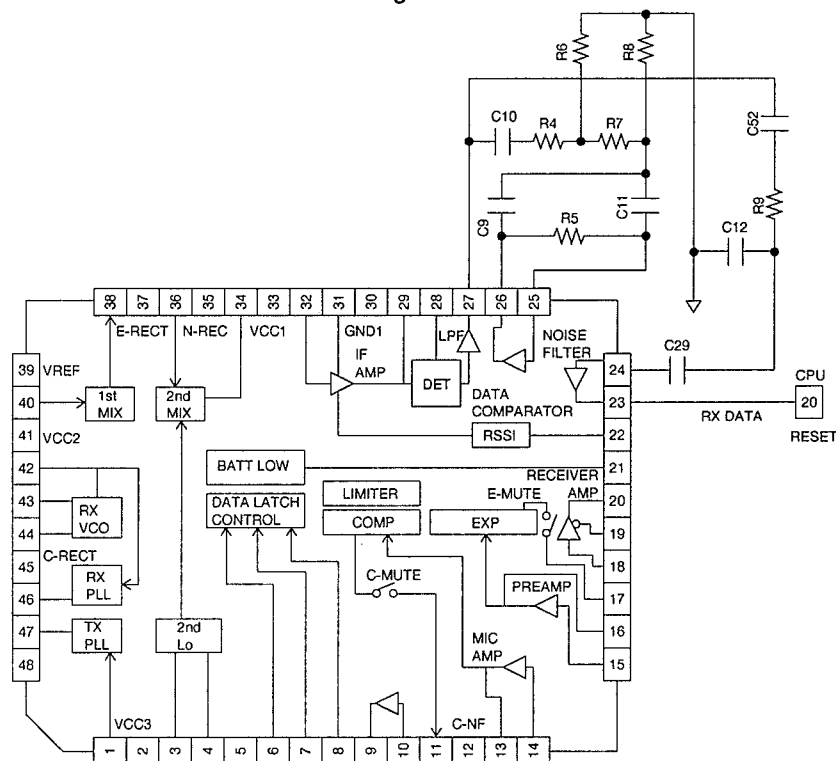


Fig. 54

BATTERY LOW DETECTOR CIRCUIT

Circuit Operation:

When the battery voltage goes down less than 3.55V. This level is detected by the input of IC 204, so its output becomes from a high state to low state. The CPU detects this level by its Pin 32 and battery low indicator lights starts flashing.

The IC203 check the level of the battery, if this level is less than 3.0V, the output of IC203 becomes to low state, then CPU stops working to keep memory.

Circuit Diagram

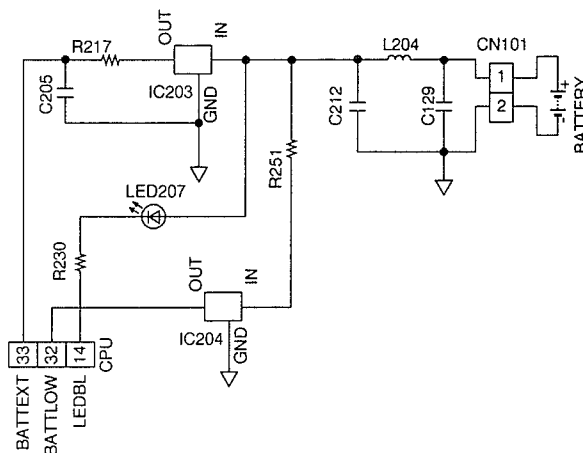


Fig. 55

TROUBLESHOOTING GUIDE

Symptom	Refer to page –.	Unit for repair
The base unit does not respond to a call from portable handset.	18,19	Base Unit
The base unit does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.		
The reception sensitivity of base unit is low with noise.		
The transmit level is large or small.		
The reception level is large or small.		
The unit does not link.		
The In Use/Charge indicator does not flash.	72,73	
The charge indicator does not light.	73	
The beep is not heard from the portable handset.	73	
No power/dead.	74	
Does not record.	75	
Does not playback.	75	
Cannot find the synthesized voice.	76	
End of message is clipped when caller hangs up.	76	
When speakerphone works, does not receive.	77	
When speakerphone works, does not transmit.	77	
The movement of battery low indicator is wrong.	39, 40	Portable Handset
The base unit does not respond to a call from portable handset.		
The base unit does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.		
The reception sensitivity of base unit is low with noise.		
Does not link between base unit and portable handset.		
The reception level is large or small.		
The transmit level is large or small.		
After stand-by mode, the portable handset does not becomes the battery save mode.	78	
The beep is not heard from the portable handset.	79	
The TALK indicator does not flash.	79	

TROUBLESHOOTING GUIDE (BASE UNIT)

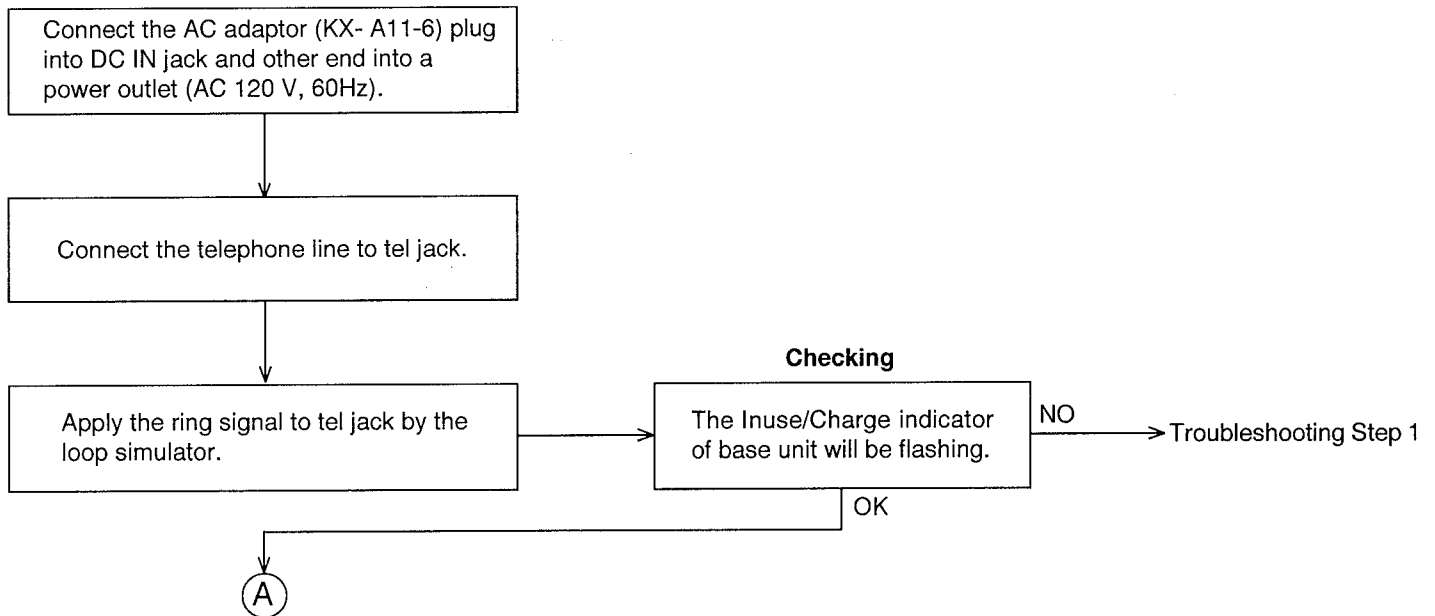
Base Unit Condition:

1. Set the Volume/Ringer button to "MAX".
2. Set the dialing mode selector to "Tone".

When checking the base unit only

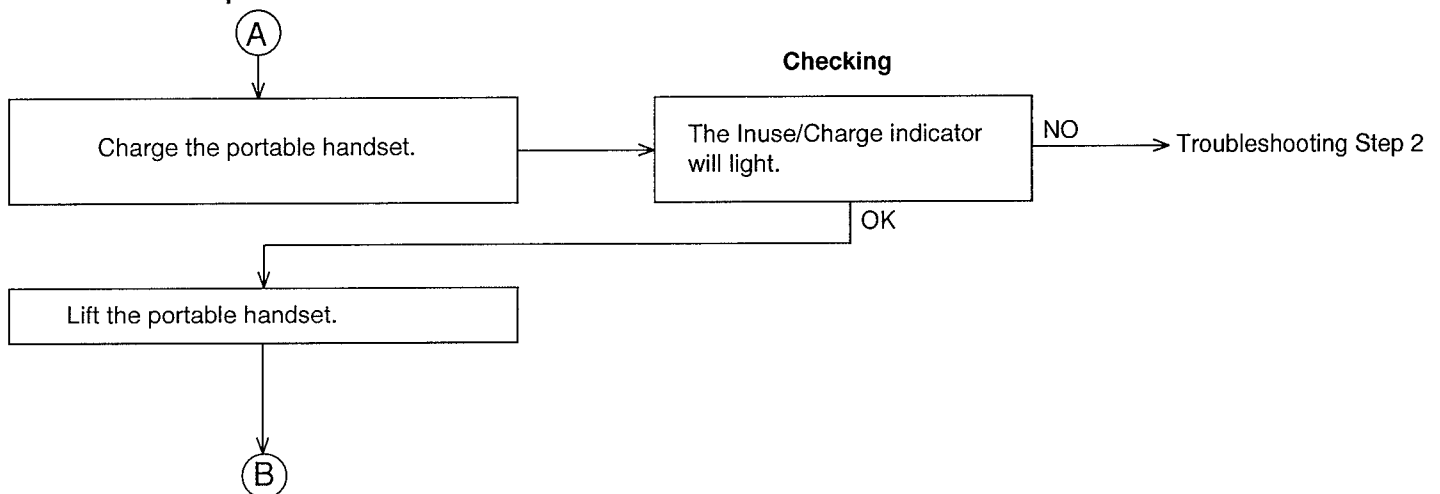
Check the base unit as shown by following below flow chart.

Operation

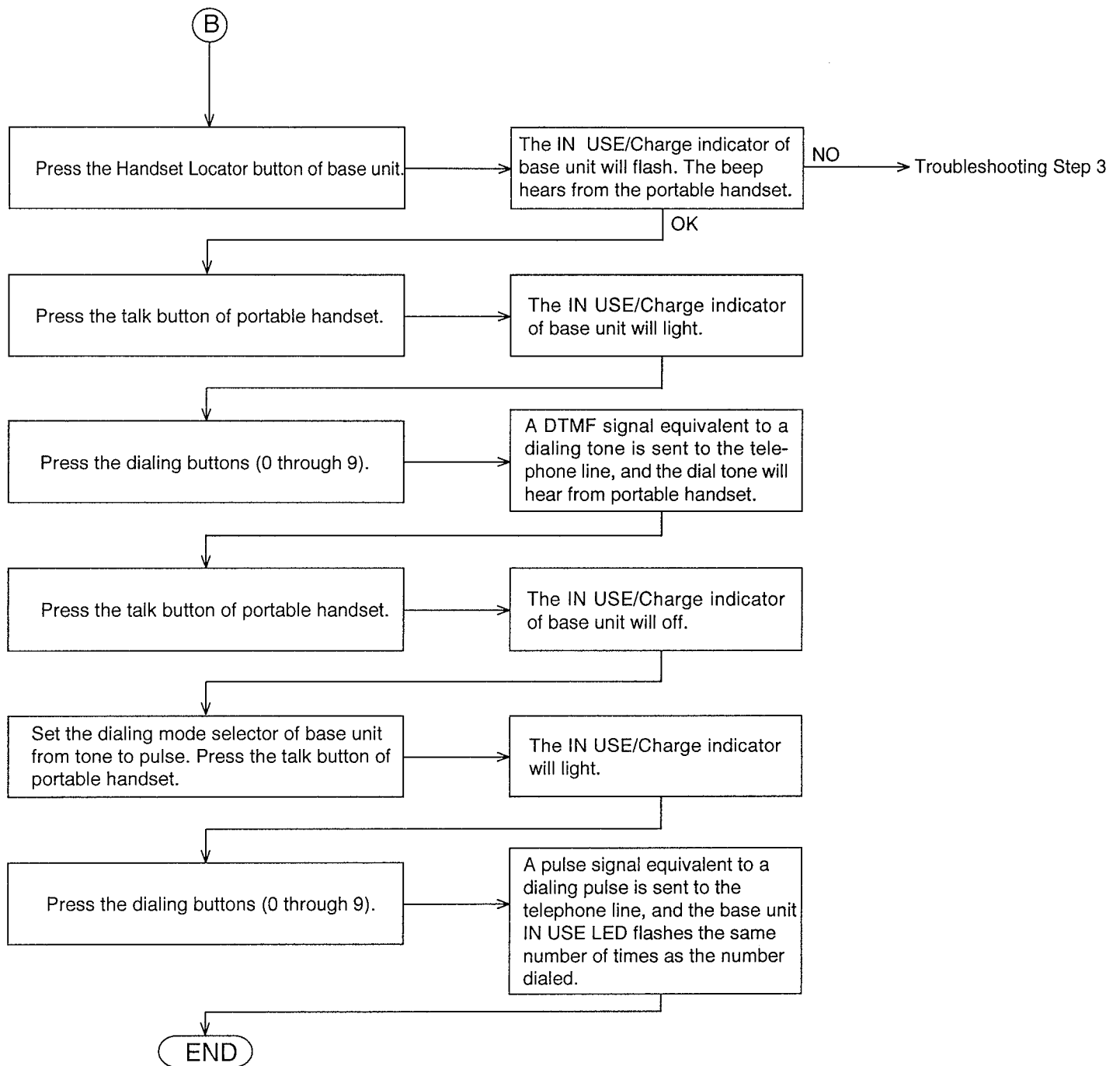


When checking the base unit and portable handset

Operation



KX-TCM422-B/KX-TCM422-W



Troubleshooting Step 1:

The In Use/Charge indicator (LED551) does not flash.

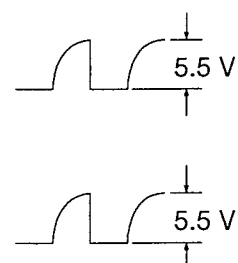
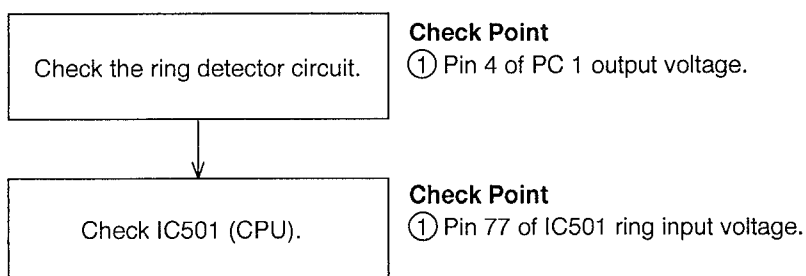
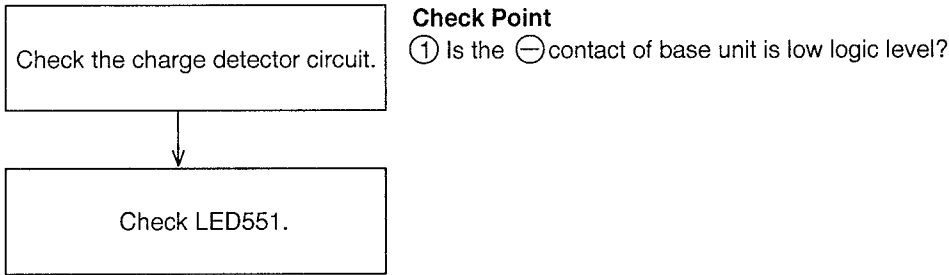


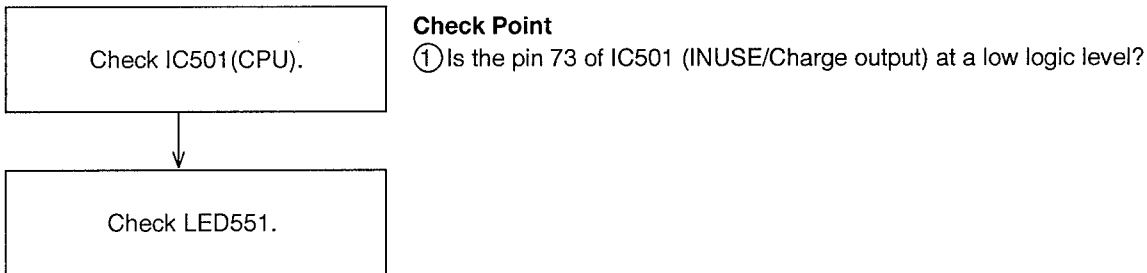
Fig. 58

Troubleshooting Step 2: The charge indicator does not light.

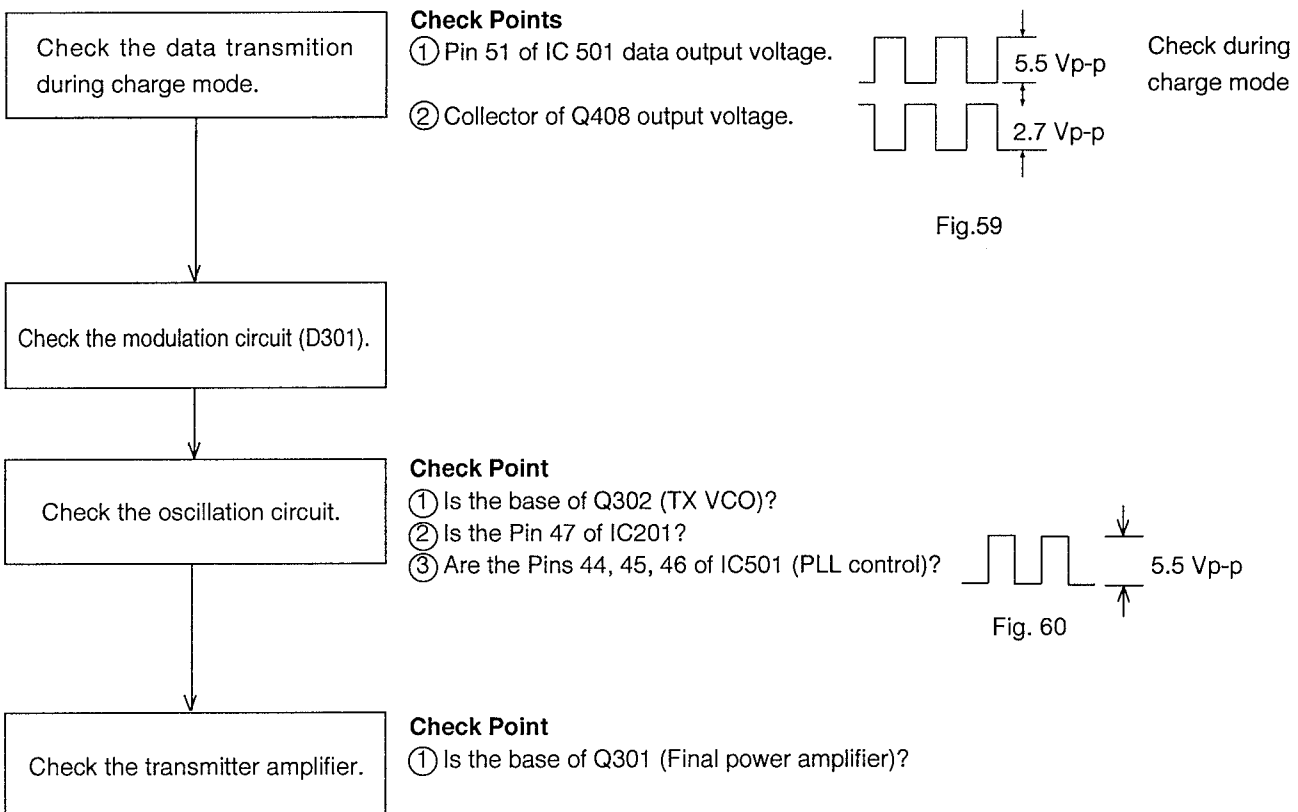


Troubleshooting Step 3:

1) The INUSE/CHARGE indicator does not flash.



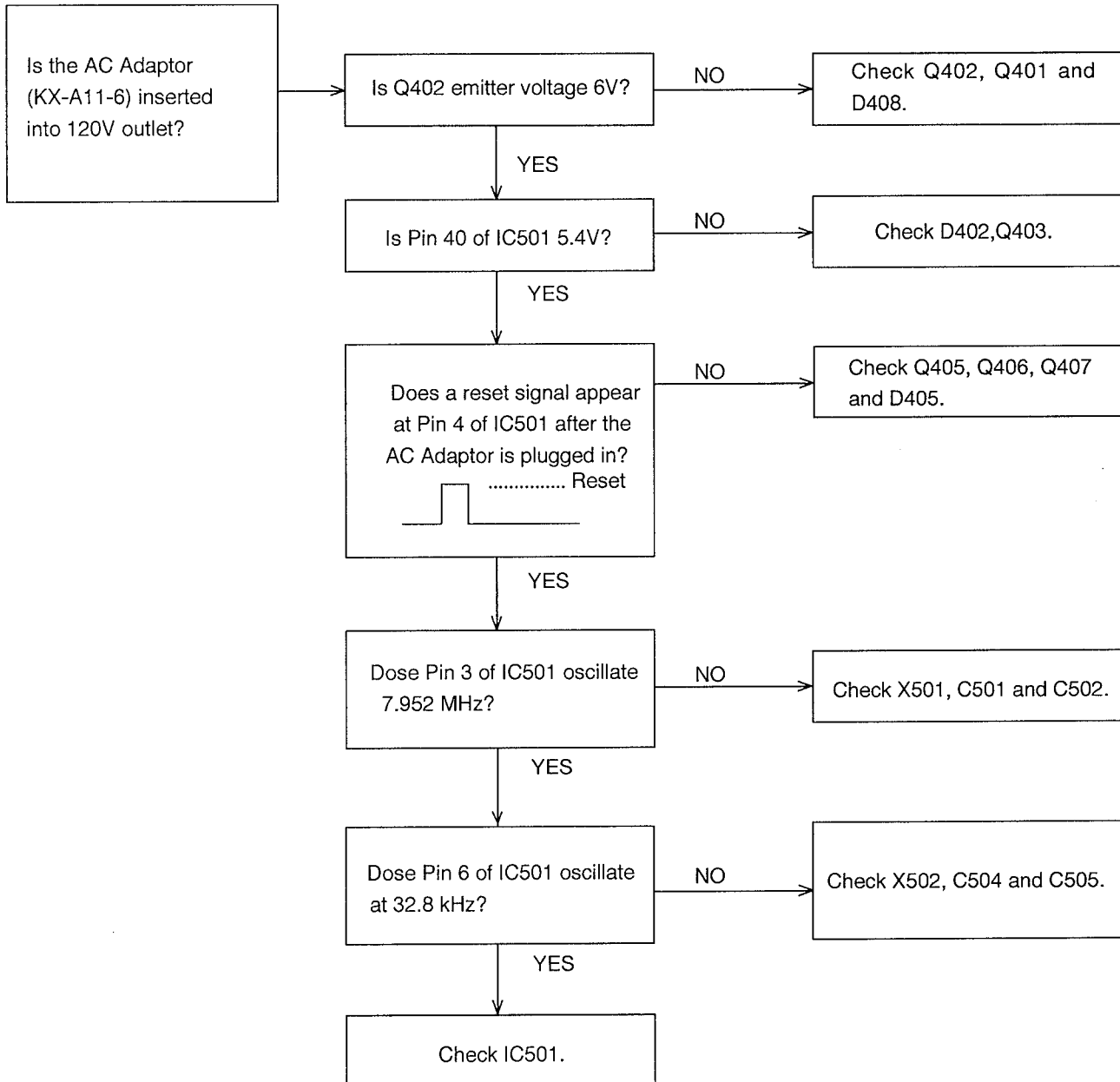
2) The beep is not heard from the portable handset.



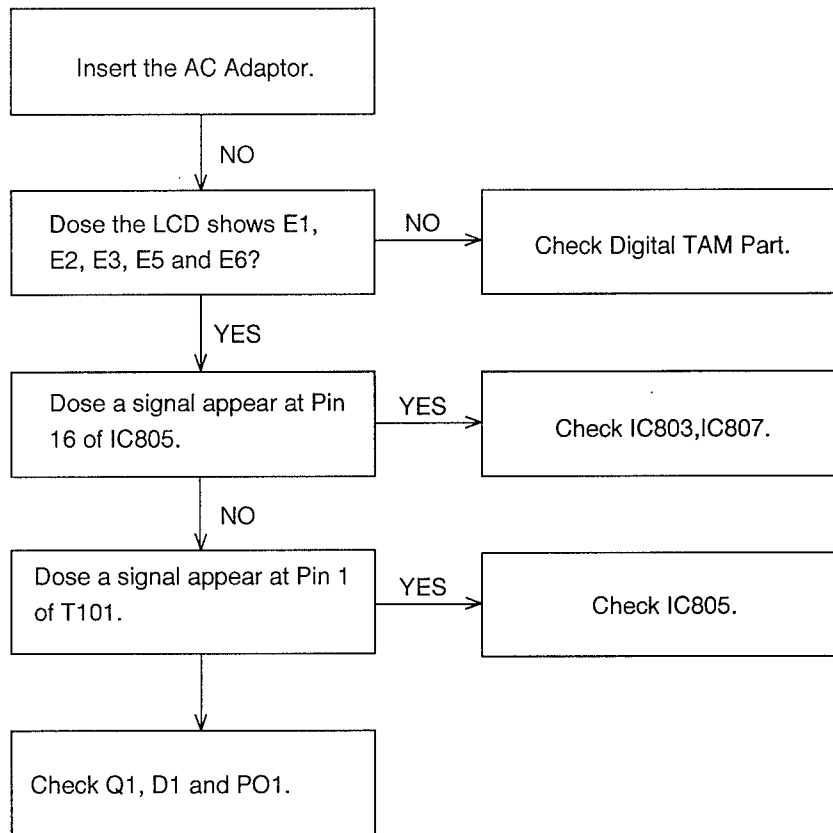
KX-TCM422-B/KX-TCM422-W

(TAM SECTION)

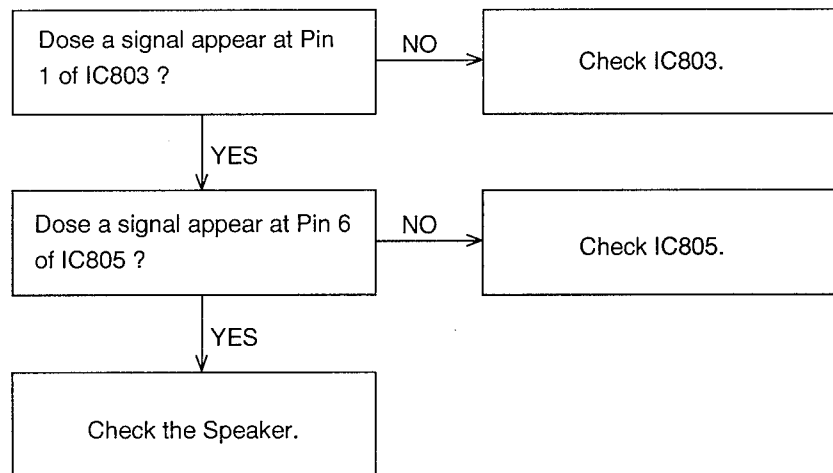
1. NO POWER/DEAD



2. DOES NOT RECORD

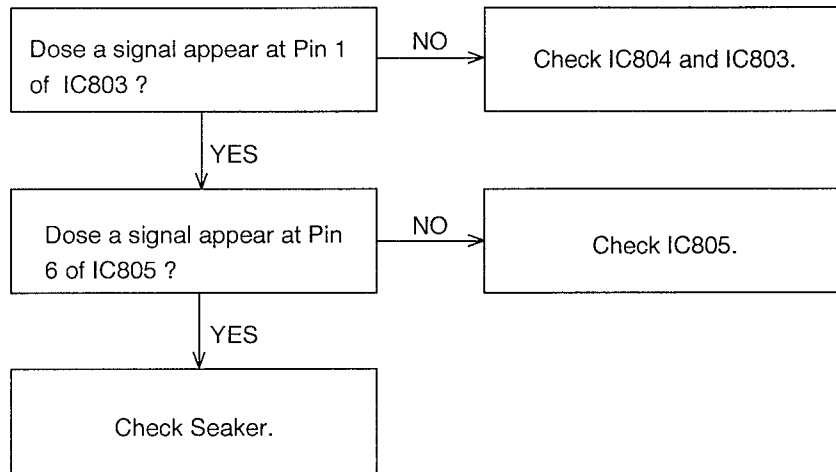


3. DOES NOT PLAYBACK



KX-TCM422-B/KX-TCM422-W

4. CANNOT FIND THE SYNTHESIZED VOICE



5. END OF MESSAGE IS CLIPPED WHEN CALLER HANGS UP.

When caller hangs up, the KX-TCM422-B can detect the following 4 signal type.

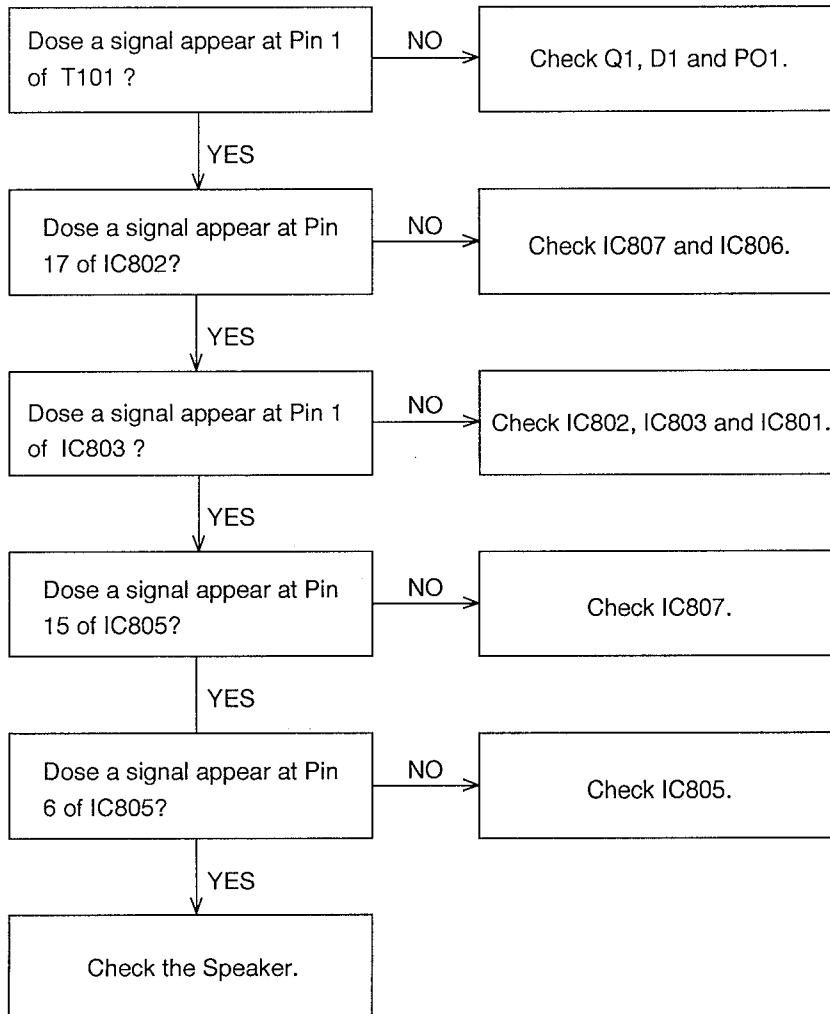
- A. CPC pulse.
- B. Dial tone or other continuous tones.
- C. Silence.
- D. Cycle signals.

A. Check CPC DETECTOR CIRCUIT (D4, R8, C9, R501 and PC4)

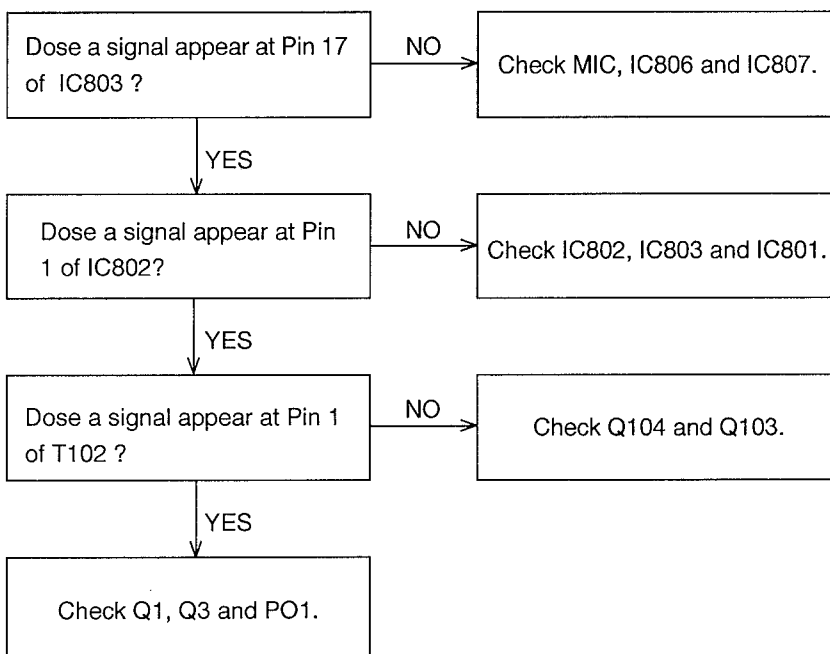
B.,C.,D

Check VOX DETECTOR CIRCUIT (IC805, R843, R841, C841 and C846)

6. WHEN SP-PHONE WORKS, DOES NOT RECEIVE.



7. WHEN SP-PHONE WORKS, DOES NOT TRANSMIT.



TROUBLESHOOTING GUIDE (PORTABLE HANDSET)

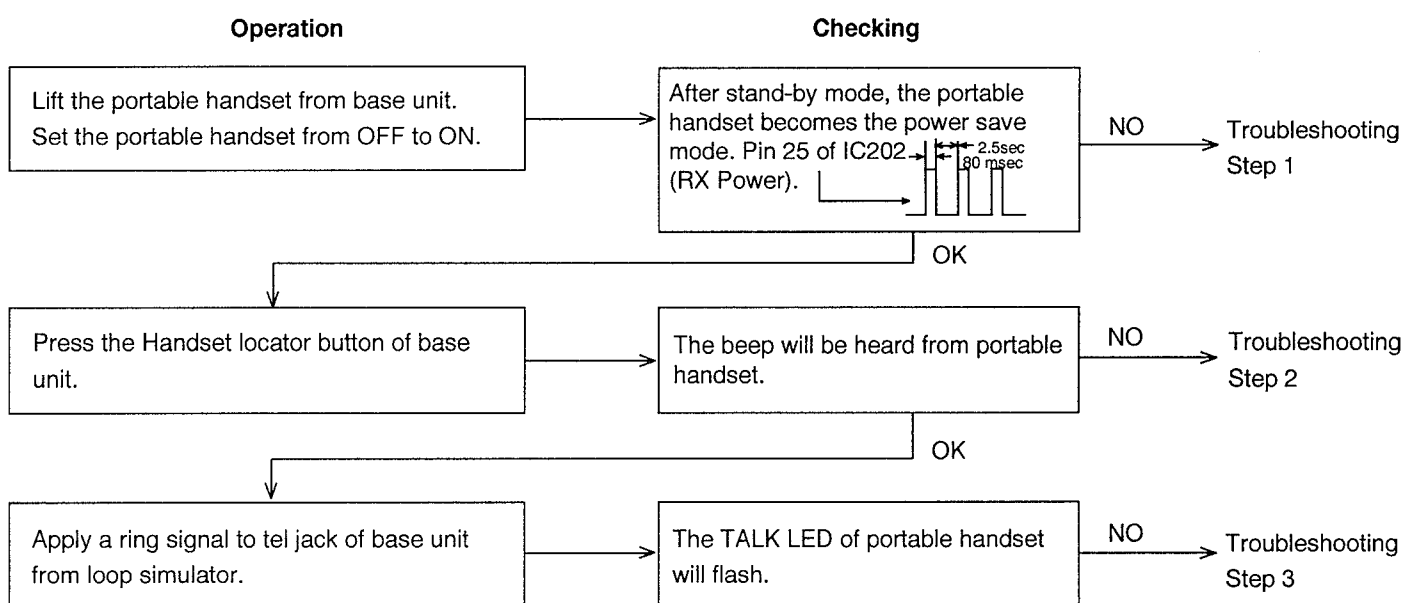
Use the right base unit for this troubleshooting.

Charge the battery of the portable handset by the base unit.

Base unit condition:

1. Connect the AC Adaptor (KX-A11-6) plug into DC IN jack and the other end into a power outlet (AC 120 V, 60Hz).
2. Connect the loop simulator (DC 48 V) to tel jack.

Check the portable handset as shown by following below flow chart.



Troubleshooting Step 1: After stand-by mode, the portable handset does not becomes the battery save mode.

Check point

- (1) Pin 25 of IC202
RX power output voltage

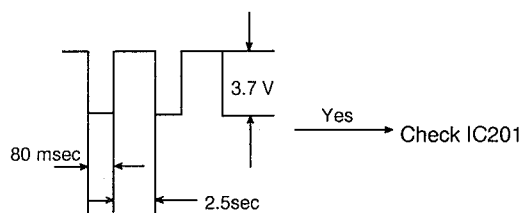
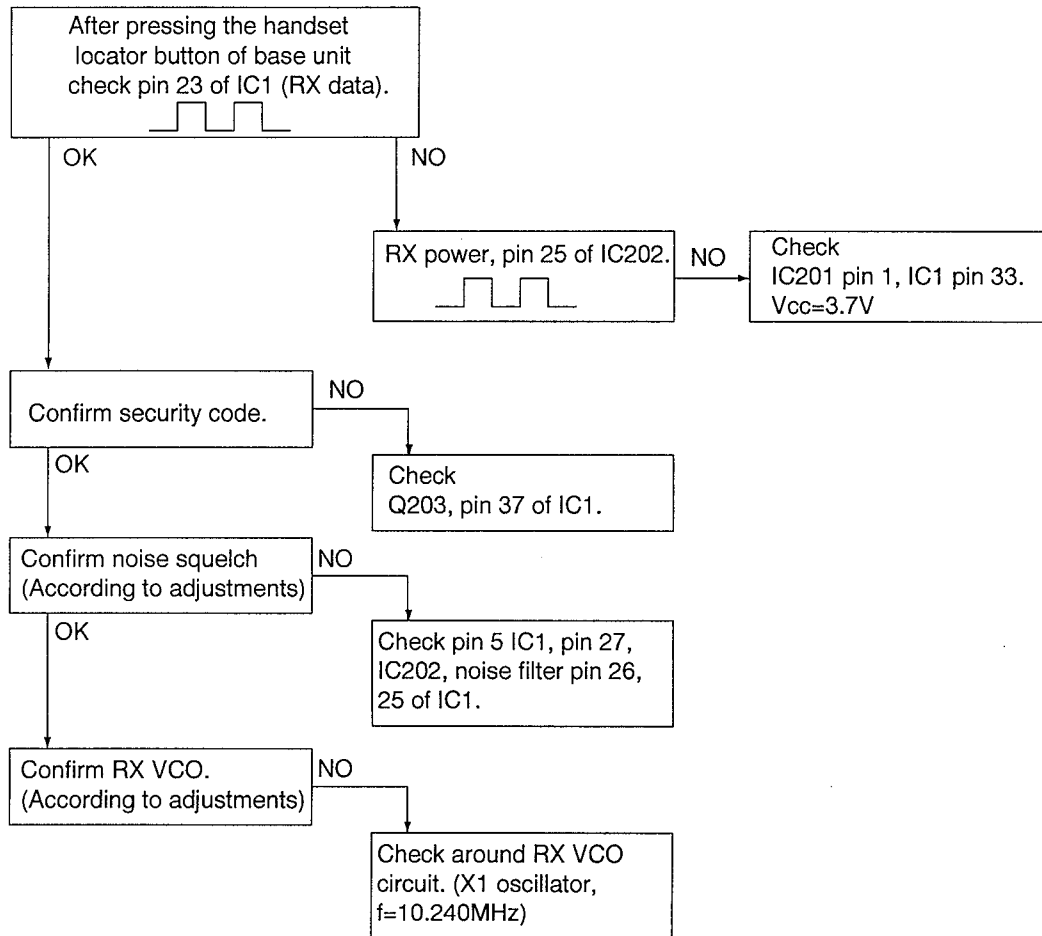
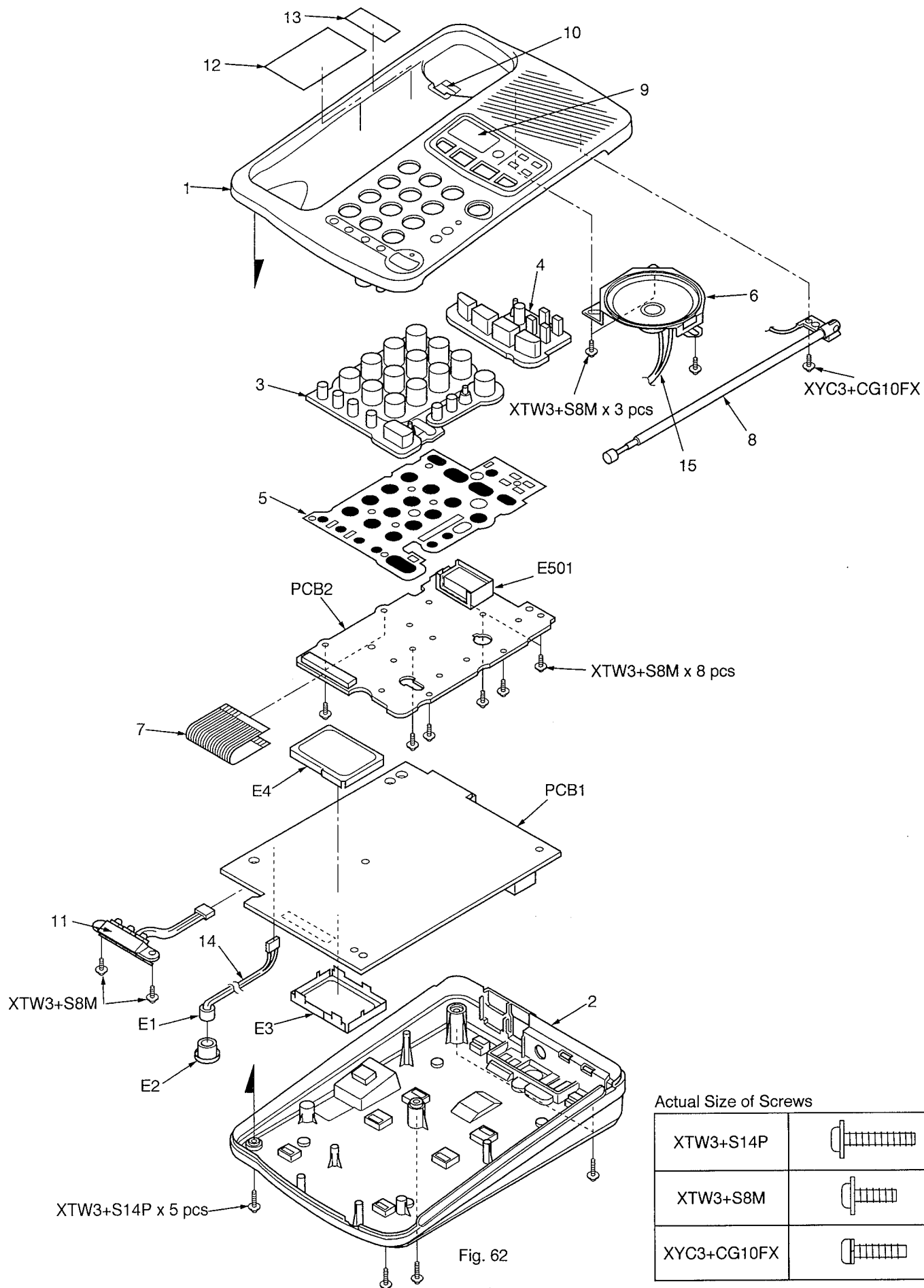


Fig. 61

Troubleshooting Step 2: The Beep is not heard on the Portable Handset.**Check Points****Troubleshooting Step 3: The TALK indicator does not flash (Check the data reception).****Check Point**

Check the signal level of receiver data circuit on page 68.

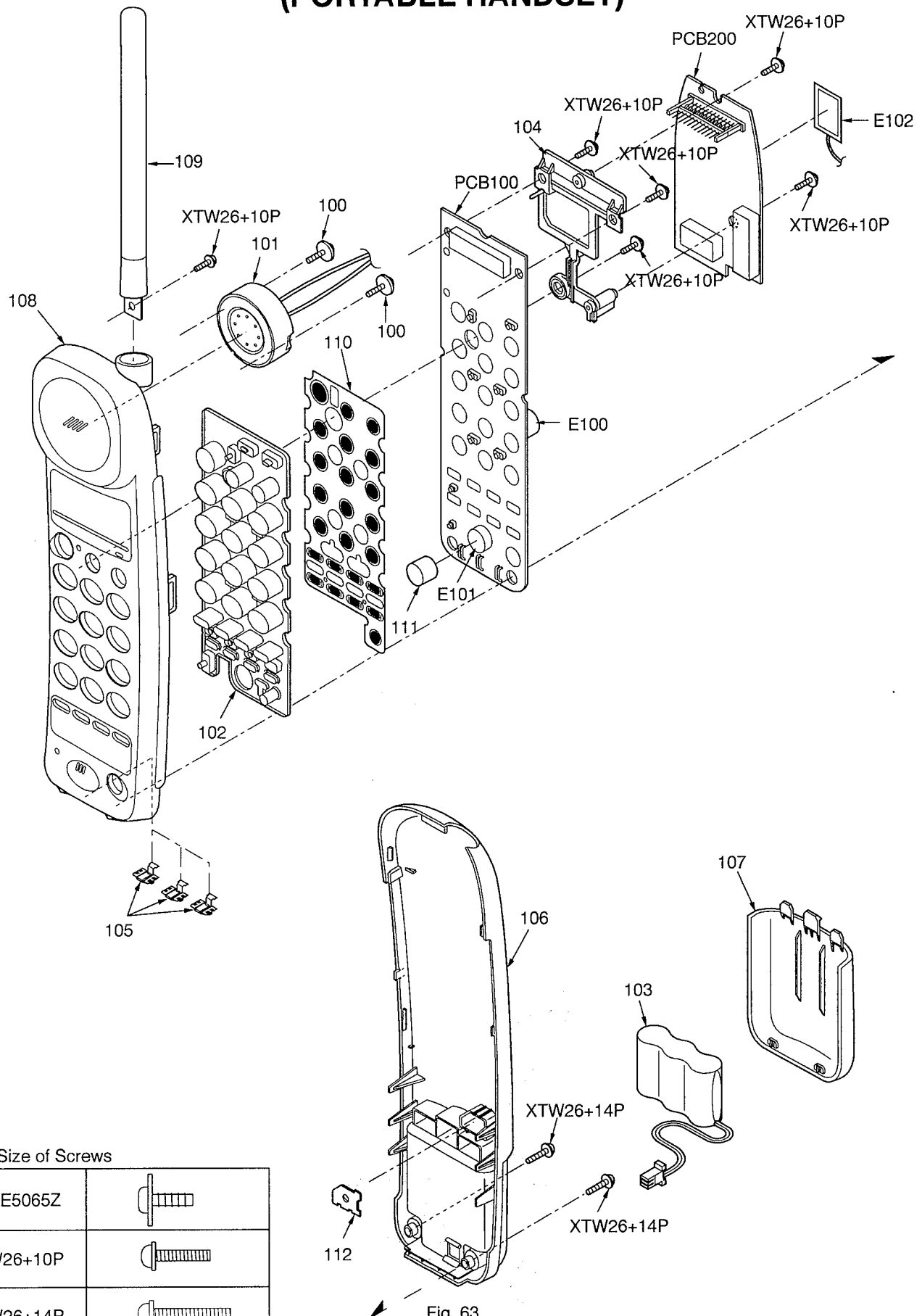
CABINET AND ELECTRICAL PARTS LOCATION (BASE UNIT)



Actual Size of Screws

XTW3+S14P	
XTW3+S8M	
XYC3+CG10FX	

CABINET AND ELECTRICAL PARTS LOCATION (PORTABLE HANDSET)



Actual Size of Screws

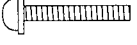
PJHE5065Z	
XTW26+10P	
XTW26+14P	

Fig. 63

ACCESSORIES AND PACKING MATERIALS

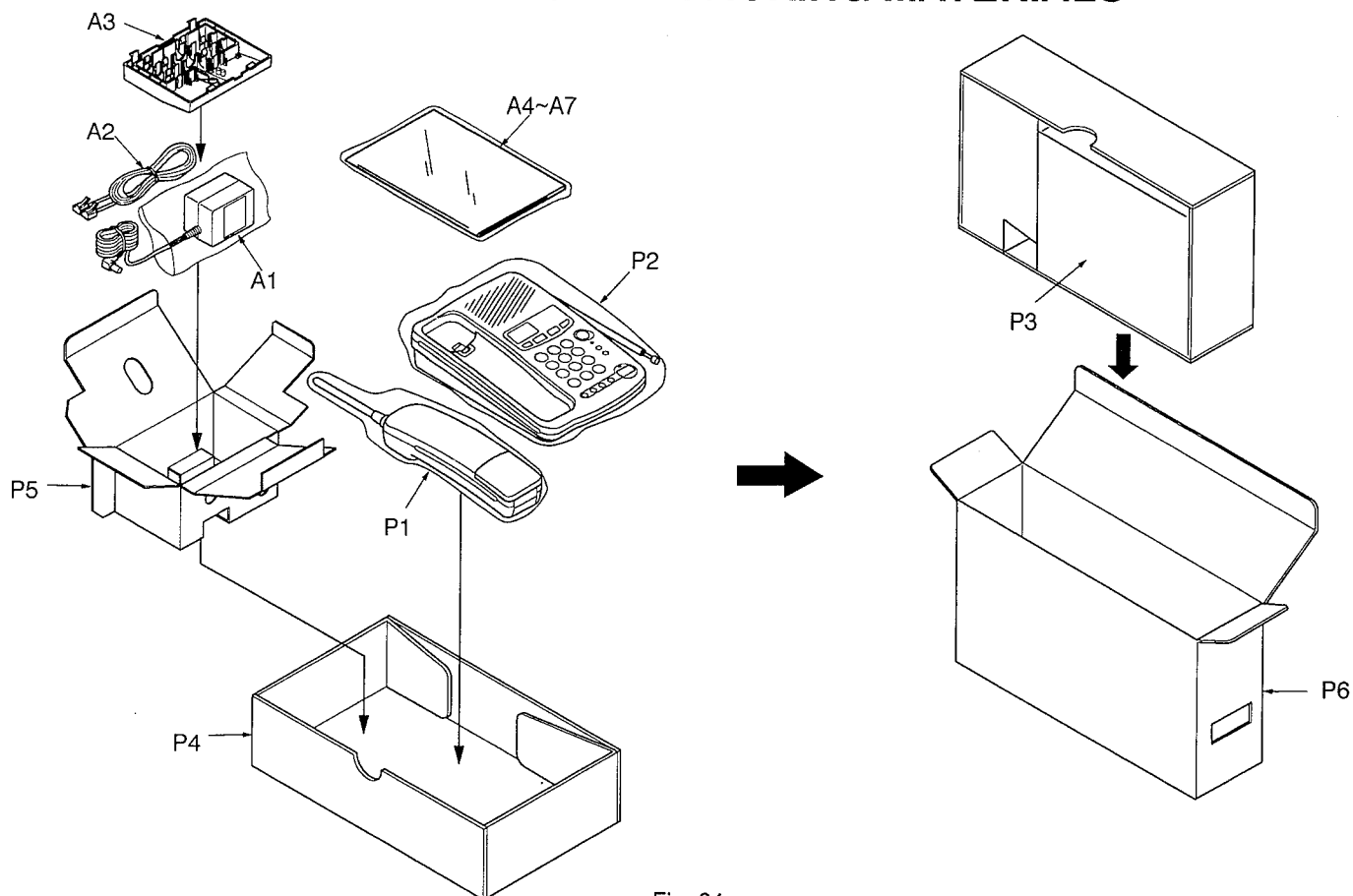


Fig. 64

EXTENSION CABLE CONNECTING METHOD

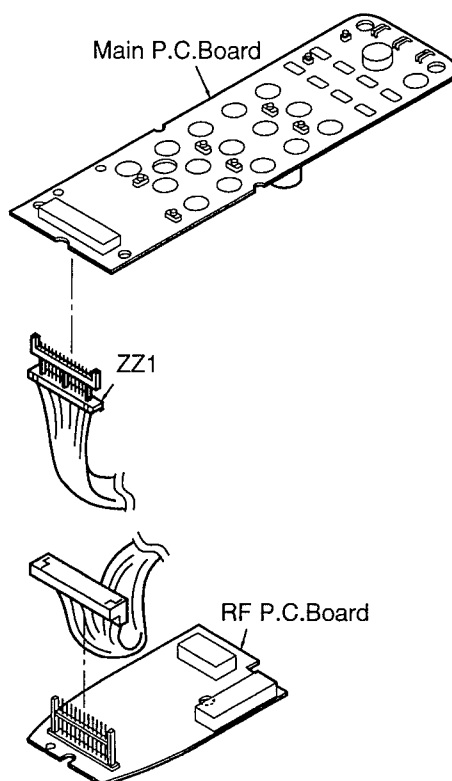


Fig. 65

This replacement parts list is U. S. A. version only.

Refer to the simplified manual(cover) for Canada or other areas.

REPLACEMENT PARTS LIST**Base Unit**

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by a Δ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) K=1000 Ω , M=1000K Ω All capacitors are in MICRO FARADS (μ F) P= μ F

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V	
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V	
2E:250V	2:200V	1V:35V	1C :16V	1J :63V	
2H:500V		0J:6.3V	1E,25:25V	2A :100V	

Ref. No.	Part No.	Part Name & Description	Pcs/Set
CABINET & ELECTRICAL PARTS			
1	PQKM10276Z2	UPPER CABINET (BLACK)	1
1	PQKM10276Z1	UPPER CABINET (WHITE)	1
2	PQYF10110Z2	LOWER CABINET (BLACK)	1
2	PQYF10110Y1	LOWER CABINET (WHITE)	1
3	PQBX10284Z	BUTTON (BLACK)	1
3	PQBX10284Y	BUTTON (WHITE)	1
4	PQBX10285Z	BUTTON (BLACK)	1
4	PQBX10285Y	BUTTON (WHITE)	1
5	PQSX10056Z	KEYBOARD SWITCH	1
6	PQAS65P36Y	SPEAKER	1
7	PQJE10085Z	FLAT CABLE	1
8	XEAPQK170D	ANTENNA	1
9	PQGP10134Z2	LCD PANEL (BLACK)	1
9	PQGP10134Z1	LCD PANEL (WHITE)	1
10	PQKE10066Z2	HANGER	S 1
11	PQJT10136Z	CHARGE TERMINAL	1
12	PQQT11232Z	INDICATION LABEL	1
13	PQQT11431Z	INDICATION LABEL	1
14	PQJS02P24Y	CONNECTOR (for MIC)	1
15	PQJS02P27Z	CONNECTOR (for SP)	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
MAIN P.C.BOARD PARTS			
PCB1	PQWP1CM422BH	P.C.BOARD AS'Y (RTL)	1
		(ICS)	
IC101	AN6183SAE1	IC	1
IC201	PQVITB31224H	IC	1
IC501	PQVI53MF5005	IC	1
IC502	PQVI93LC46XI	IC	S 1
IC801	PQVID6471A	IC	1
IC802	PQVIMCL548DW	IC	1
IC803	PQVIMCL548DW	IC	1
IC804	PQVIKM29N4TC	IC	1
IC805	PQVISC111815	IC	1
IC806	PQVINJM4558M	IC	1
IC807	PQVIBU4053BF	IC	1
		(TRANSISTORS)	
Q1	2SA1625	TRANSISTOR(SI) (or 2SA1776Q)	Δ 1
Q2	2SC1740S	TRANSISTOR(SI)	Δ 1
		(or 2SC3311AS or 2SC3330U)	
Q3	2SC2120	TRANSISTOR(SI)	Δ 1
Q101	2SD1819A	TRANSISTOR(SI)	1
Q102	PQVTFB1A4M	TRANSISTOR(SI)	1
Q103	2SD1819A	TRANSISTOR(SI)	1
Q104	2SD1819A	TRANSISTOR(SI)	1
Q105	PQVTFB1A4M	TRANSISTOR(SI)	1
Q201	2SK543	TRANSISTOR(SI)	1
Q301	PQVTMSC2295C	TRANSISTOR(SI)	1
		(or 2SC2295C or 2SC2413KPT146)	
Q302	2SC2412K	TRANSISTOR(SI)	1
Q352	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081ST106 or 2SC4155S)	
Q401	2SD2137	TRANSISTOR(SI)	1
Q402	2SD1994A	TRANSISTOR(SI)	1
Q403	2SD1994A	TRANSISTOR(SI)	1
Q404	2SD1991A	TRANSISTOR(SI)	1
Q405	2SD1819A	TRANSISTOR(SI)	1
Q406	2SB709A	TRANSISTOR(SI)	1
Q407	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081ST106 or 2SC4155S)	
Q408	2SD1991A	TRANSISTOR(SI)	1
Q409	2SD1991A	TRANSISTOR(SI)	1
Q410	2SD1991A	TRANSISTOR(SI)	1
Q411	2SD601A	TRANSISTOR(SI)	1
Q501	PQVTDTA114YU	TRANSISTOR(SI)	1
Q502	PQVTDTA114YU	TRANSISTOR(SI)	1
Q503	PQVTDTA114YU	TRANSISTOR(SI)	1
Q801	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081ST106 or 2SC4155S)	
Q802	2SB1218A	TRANSISTOR(SI)	1
		(or 2SA1576ST106 or 2SA1603S)	
Q803	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081ST106 or 2SC4155S)	
Q804	PQVTFB1A4M	TRANSISTOR(SI)	1
Q805	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081ST106 or 2SC4155S)	
Q959	2SB1218A	TRANSISTOR(SI)	1
		(or 2SA1576ST106 or 2SA1603S)	
		(DIODES)	
D1	PQVDS1ZB40F1	DIODE(SI)	Δ 1
D3	MA700A	DIODE(SI)	Δ 1
D4	PQVDMTZ3R6	DIODE(SI)	Δ 1
D201	MA110	DIODE(SI)	1

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Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
D202	MA110	DIODE(SI)	1			(RESISTOE ARRAYS)	
D250	MA110	DIODE(SI)	1	RA801	EXRV8V221JV	RESISTOR ARRAY	1
D251	MA110	DIODE(SI)	1	RA802	EXRV8V222JV	RESISTOR ARRAY	1
D301	PQVDKV1832C3	DIODE(SI)	1	RA803	EXRV8V222JV	RESISTOR ARRAY	1
D303	1SS119	DIODE(SI)	1	RA804	EXRV8V220JV	RESISTOR ARRAY	1
D401	MA4100	DIODE(SI)	1	RA805	EXRV8V472JV	RESISTOR ARRAY	1
D402	MA4062	DIODE(SI)	1	RA806	EXRV8V472JV	RESISTOR ARRAY	1
D403	1SS119	DIODE(SI)	1	RA807	EXRV8V472JV	RESISTOR ARRAY	1
D404	1SS119	DIODE(SI)	1	RA808	EXRV8V222JV	RESISTOR ARRAY	1
D405	MA4047	DIODE(SI)	1	RA809	EXRV8V221JV	RESISTOR ARRAY	1
D406	1SS119	DIODE(SI)	1	RA810	EXRV8V221JV	RESISTOR ARRAY	1
D407	1SS119	DIODE(SI)	1				
D412	1SS119	DIODE(SI)	1				
D413	MA110	DIODE(SI)	1			(CAPACITOR ARRAYS)	
D414	MA110	DIODE(SI)	1	CA801	EXF1E4470KCV	COMPONENTS PARTS	1
D415	1SS119	DIODE(SI)	1	CA802	EXF1E4470KCV	COMPONENTS PARTS	1
D416	MA4062	DIODE(SI)	1	CA803	EXF1E4470KCV	COMPONENTS PARTS	1
D417	MA700A	DIODE(SI)	1	CA804	EXF1E4331KSL	COMPONENTS PARTS	1
D508	MA110	DIODE(SI)	1				
D511	MA110	DIODE(SI)	1				
D512	MA110	DIODE(SI)	1			(CERAMIC FILTERS)	
D521	1SS119	DIODE(SI)	1	CF201	PQVFSFE107MJ	CERAMIC FILTER	S 1
D522	1SS119	DIODE(SI)	1	CF202	PQVFCFH455F1	CERAMIC FILTER	1
D523	1SS119	DIODE(SI)	1	CF401	PQVFCM04RC01	CERAMIC FILTER	1
D524	MA110	DIODE(SI)	1				
D525	MA110	DIODE(SI)	1				
D911	MA4220	DIODE(SI)	△ 1			(CONNECTORS)	
J2	PQVDDSP272MR	VARISTOR	△ 1	CN1	PQJP3G38Z	CONNECTOR	1
				CN501	PQJS30A19Z	CONNECTOR	1
				CHARGE	PQJS03P23Z	CONNECTOR	1
				MIC CN	PQJP02B59Z	CONNECTOR	1
				SP CN	PQJP02B59Z	CONNECTOR	1
		(COILS AND TRANSFORMERS)					
L202	PQLQZK1R8M	COIL	S 1				
L450	PQLQZM330K	COIL	1				
L451	PQLQZM330K	COIL	1				
L452	PQLQZM330K	COIL	1				
L501	PQLQZM100K	COIL	1	JJ1	PQJJ1B4Y	JACK, DC IN	△ 1
L502	PQLQZM100K	COIL	1	CN4	PQJJ1TA15Z	JACK,TEL	△ 1
L801	PQLQZM100K	COIL	1	DUP201	PQVFH25RX	DUPLEX	1
L803	PQLQZM100K	COIL	1	DUP301	PQVFH25TX	DUPLEX	1
L804	PQLQZM100K	COIL	1	SA1	PQVDDSS301L	VARISTOR	△ 1
L806	PQLQZM100K	COIL	1	PO1	PQRPAR390N	THERMISTOR	△ S 1
L807	PQLQZM100K	COIL	1	E1	PQJM122Z	MICROPHONE	1
T101	PQLT3E3A	I/F TRANSFORMER	△ 1	E2	PQMG10020Z	SPACER	1
T102	PQLT3E3A	I/F TRANSFORMER	△ 1	E3	PQMC10252Z	SHIELD COVER	1
T201	PQLA7A36	COIL	1	E4	PQMC10253Z	SHIELD COVER	1
T202	PQLI2B201	COIL	1				
T203	PQLA7A22	COIL	1				
T301	PQL04A3	COIL	1				
J401	PQLQZM100K	COIL	1			(RESISTORS)	
				R1	ERDS2TJ473	47K	△ 1
				R2	ERDS2TJ104	100K	△ 1
				R3	ERDS2TJ472	4.7K	△ 1
				R4	PQ4R10XJ393	39K	△ S 1
PC1	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	△ 1	R5	PQ4R10XJ393	39K	△ S 1
PC2	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	△ 1	R6	PQ4R10XJ562	5.6K	△ S 1
PC3	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	△ 1	R7	ERDS2TJ562	5.6K	△ 1
PC4	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	△ 1	R8	ERDS2TJ560	56	△ 1
				R10	PQ4R10XJ102	1K	△ S 1
				R12	PQ4R10XJ333	33K	△ S 1
				R14	PQ4R10XJ102	1K	△ S 1
X201	PQVCK1024LC5	CRYSTAL OSCILLATOR	1	R15	PQ4R10XJ392	3.9K	△ S 1
X501	PQVCK7952N4Z	CRYSTAL OSCILLATOR	1	R16	ERDS2TJ680	68	△ 1
X502	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1	R17	ERDS1TJ330	33	△ S 1
X801	PQVCJ3686N4Z	CRYSTAL OSCILLATOR	1	R19	PQ4R10XJ123	12K	△ S 1
				R63	PQ4R10XJ472	4.7K	△ S 1
				R101	ERJ3GEYJ103	10K	1
				R102	ERJ3GEYJ334	330K	1
VR201	EVNDXAA03B24	VARIABLE RESISTOR	1	R103	PQ4R10XJ272	2.7K	S 1
VR301	EVNDXAA03B15	VARIABLE RESISTOR	1	R104	PQ4R10XJ561	560	S 1
VR302	EVNDXAA03B35	VARIABLE RESISTOR	1	R106	ERJ3GEYJ682	6.8K	1
				R107	ERJ3GEYJ393	39K	1
				R109	ERJ3GEYJ223	22K	1

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Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R110	PQ4R10XJ683	68K	S 1	R406	ERJ3GEYJ224	220K	1
R112	PQ4R10XJ101	100	S 1	R407	ERJ3GEYJ154	150K	1
R113	PQ4R10XJ471	470	S 1	R408	ERJ3GEYJ104	100K	1
R114	PQ4R10XJ104	100K	S 1	R409	ERJ3GEYJ224	220K	1
R115	ERJ3GEYJ103	10K	1	R410	ERJ3GEYJ104	100K	1
R116	ERJ3GEYJ272	2.7K	1	R411	ERJ3GEYJ104	100K	1
R117	ERJ3GEYJ684	680K	1	R412	ERJ3GEYJ184	180K	1
R118	PQ4R10XJ820	82	S 1	R414	ERJ3GEYJ473	47K	1
R119	PQ4R10XJ473	47K	S 1	R415	ERDS2TJ391	390	1
R120	PQ4R10XJ103	10K	S 1	R418	ERDS2TJ221	220	1
R121	ERJ3GEYJ683	68K	1	R419	PQ4R10XJ103	10K	S 1
R122	PQ4R10XJ473	47K	S 1	R421	ERJ3GEYJ104	100K	1
R123	ERJ3GEY0R00	0	1	R422	ERDS1TJ470	47	1
R128	ERJ3GEYJ104	100K	1	R502	ERJ3GEYJ106	10M	1
R129	PQ4R10XJ820	82	S 1	R503	ERJ3GEYJ472	4.7K	1
R131	ERJ3GEYJ824	820K	1	R504	ERJ3GEYJ472	4.7K	1
R202	PQ4R10XJ271	270	S 1	R505	ERJ3GEYJ472	4.7K	1
R204	PQ4R10XJ220	22	S 1	R506	ERJ3GEYJ222	2.2K	1
R205	ERJ3GEYJ331	330	1	R507	ERJ3GEYJ272	2.7K	1
R206	ERJ3GEYJ183	18K	1	R508	ERJ3GEYJ472	4.7K	1
R207	ERJ3GEYJ822	8.2K	1	R509	ERJ3GEYJ392	3.9K	1
R208	ERJ3GEYJ182	1.8K	1	R510	ERDS2TJ271	270	1
R209	ERJ3GEYJ154	150K	1	R511	PQ4R10XJ333	33K	S 1
R210	ERJ3GEYJ154	150K	1	R512	ERJ3GEYJ333	33K	1
R211	ERJ3GEYJ562	5.6K	1	R513	PQ4R10XJ273	27K	S 1
R212	PQ4R10XJ153	15K	S 1	R514	ERJ3GEYJ392	3.9K	1
R213	ERJ3GEYJ104	100K	1	R515	ERJ3GEYJ223	22K	1
R214	PQ4R10XJ154	150K	S 1	R516	ERJ3GEYJ105	1M	1
R215	PQ4R10XJ123	12K	S 1	R517	ERJ3GEYJ473	47K	1
R216	PQ4R10XJ472	4.7K	S 1	R519	ERJ3GEYJ104	100K	1
R218	PQ4R10XJ273	27K	S 1	R520	ERJ3GEYJ104	100K	1
R219	PQ4R10XJ562	5.6K	S 1	R521	PQ4R10XJ104	100K	S 1
R220	ERJ3GEYJ333	33K	1	R522	ERJ3GEYJ104	100K	1
R221	ERJ3GEYJ334	330K	1	R523	ERJ3GEYJ104	100K	1
R222	ERJ3GEYJ103	10K	1	R524	PQ4R10XJ104	100K	S 1
R226	ERJ3GEYJ106	10M	1	R525	ERJ3GEYJ473	47K	1
R227	ERJ3GEYJ106	10M	1	R526	PQ4R10XJ391	390	S 1
R228	ERJ3GEYJ104	100K	1	R527	PQ4R10XJ681	680	S 1
R229	ERJ3GEYJ682	6.8K	1	R528	PQ4R10XJ471	470	S 1
R230	ERJ3GEYJ682	6.8K	1	R538	ERJ3GEYJ472	4.7K	1
R231	ERJ3GEYJ103	10K	1	R539	ERJ3GEYJ104	100K	1
R232	ERJ3GEYJ103	10K	1	R540	ERJ3GEYJ472	4.7K	1
R233	ERJ3GEYJ395	3.9M	1	R541	ERJ3GEYJ472	4.7K	1
R234	ERJ3GEYJ104	100K	1	R542	ERJ3GEYJ222	2.2K	1
R235	ERJ3GEY0R00	0	1	R543	ERJ3GEYJ222	2.2K	1
R237	ERJ3GEYJ103	10K	1	R545	ERJ3GEYJ472	4.7K	1
R273	ERJ3GEYJ104	100K	1	R546	ERJ3GEYJ472	4.7K	1
R275	ERJ3GEYJ182	1.8K	1	R547	ERJ3GEYJ472	4.7K	1
R276	ERJ3GEYJ471	470	1	R548	ERJ3GEYJ472	4.7K	1
R277	ERJ3GEYJ153	15K	1	R549	ERJ3GEYJ472	4.7K	1
R302	ERDS2TJ221	220	1	R550	ERJ3GEYJ472	4.7K	1
R303	ERJ3GEYJ102	1K	1	R551	ERJ3GEYJ472	4.7K	1
R304	ERJ3GEYJ153	15K	1	R552	ERJ3GEYJ472	4.7K	1
R305	ERJ3GEYJ223	22K	1	R553	ERJ3GEYJ103	10K	1
R306	ERJ3GEYJ221	220	1	R554	ERJ3GEYJ472	4.7K	1
R307	ERJ3GEYJ102	1K	1	R555	ERJ3GEYJ472	4.7K	1
R308	PQ4R10XJ220	22	S 1	R557	ERJ3GEYJ102	1K	1
R309	ERJ3GEYJ125	1.2M	1	R558	ERJ3GEYJ102	1K	1
R310	ERJ3GEYJ220	22	1	R813	ERJ3GEYJ105	1M	1
R311	PQ4R10XJ103	10K	S 1	R814	ERJ3GEYJ681	680	1
R312	ERJ3GEYJ223	22K	1	R815	ERJ3GEYJ221	220	1
R313	ERJ3GEYJ223	22K	1	R816	ERJ3GEYJ221	220	1
R358	ERJ3GEYJ562	5.6K	1	R821	ERJ3GEYJ220	22	1
R359	ERJ3GEYJ104	100K	1	R822	ERJ3GEYJ220	22	1
R375	ERJ3GEYJ563	56K	1	R823	ERJ3GEYJ103	10K	1
R376	PQ4R10XJ473	47K	S 1	R824	ERJ3GEYJ103	10K	1
R380	ERJ3GEY0R00	0	1	R825	ERJ3GEYJ153	15K	1
R401	ERDS2TJ221	220	1	R826	ERJ3GEYJ394	390K	1
R403	PQ4R10XJ154	150K	S 1	R827	ERJ3GEY0R00	0	1
R404	ERDS2TJ221	220	1	R829	ERJ3GEY0R00	0	1
R405	ERJ3GEYJ333	33K	1	R830	ERJ3GEY0R00	0	1

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Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R831	ERJ3GEYJ103	10K	1	C6	ECEA1CKA221	220	△ 1
R832	PQ4R10XJ000	0	1	C7	ECUV1H103KB	0.01	△ 1
R833	ERJ3GEYJ103	10K	1	C8	ECEA1HKS2R2	2.2	△ S 1
R834	ERJ3GEYJ473	47K	1	C9	PQCUV1E104MD	0.1	△ S 1
R835	ERJ3GEYJ473	47K	1	C11	ECEA1CKS100	10	△ S 1
R836	ERJ3GEYJ123	12K	1	C12	PQCUV1H101JC	100P	△ 1
R837	ERJ3GEYJ473	47K	1	C14	PQCUV1H223KB	0.022	△ 1
R838	ERJ3GEYJ153	15K	1	C15	ECEA1EK470	47	△ S 1
R839	ERJ3GEYJ103	10K	1	C17	ECEA1CKS220	22	△ S 1
R840	ERJ3GEY0R00	0	1	C18	ECEA1HKS010	1	△ S 1
R841	ERJ3GEYJ682	6.8K	1	C50	ECKDNB471MB	470P	△ 1
R842	PQ4R10XJ103	10K	S 1	C101	PQCUV1H102J	0.001	S 1
R843	PQ4R10XJ822	8.2K	S 1	C103	ECUV1H271JCV	270P	1
R844	ERJ3GEYF152	1.5K	1	C104	PQCUV1H222KB	0.0022	1
R845	ERJ3GEYJ683	68K	1	C105	PQCUV1E104MD	0.1	S 1
R846	ERJ3GEYJ223	22K	1	C107	PQCUV1E104MD	0.1	S 1
R847	ERJ3GEYF222	2.2K	1	C110	ECEA1CKS100	10	1
R848	ERJ3GEYJ223	22K	1	C111	PQCUV1E104MD	0.1	S 1
R850	ERJ3GEYJ473	47K	1	C112	ECUV1H101JCV	100P	1
R851	ERJ3GEYJ104	100K	1	C113	PQCUV1E104MD	0.1	S 1
R852	ERJ3GEYJ103	10K	1	C114	PQCUV1E104MD	0.1	S 1
R853	ERJ3GEYF123	12K	1	C115	ECUV1C104KBV	0.1	1
R854	ERJ3GEYJ334	330K	1	C116	PQCUV1C105ZF	1	1
R855	ERJ3GEYJ823	82K	1	C117	PQCUV1E104MD	0.1	S 1
R856	ERJ3GEYJ473	47K	1	C122	PQCUV1H392KB	0.0039	1
R857	ERJ3GEYJ103	10K	1	C123	PQCUV1H101JC	100P	1
R858	PQ4R10XJ104	100K	S 1	C124	PQCUV1H102J	0.001	S 1
R859	PQ4R10XJ103	10K	S 1	C125	ECUV1H392KBV	0.0039	1
R860	PQ4R10XJ102	1K	S 1	C126	PQCUV1E104MD	0.1	S 1
R861	PQ4R10XJ104	100K	S 1	C128	ECA1AM102	0.001	1
R862	PQ4R10XJ563	56K	S 1	C203	ECUV1C104ZFY	0.1	1
R863	PQ4R10XJ104	100K	S 1	C204	PQCUV1H103KB	0.01	1
R864	PQ4R10XJ472	4.7K	S 1	C205	PQCUV1H103KB	0.01	1
R865	PQ4R10XJ124	120K	S 1	C206	ECUV1H102KBV	0.001	1
R866	PQ4R10XJ182	1.8K	S 1	C207	ECEA1CKS100	10	S 1
R867	PQ4R10XJ104	100K	S 1	C208	PQCUV1E104MD	0.1	S 1
R868	PQ4R10XJ104	100K	S 1	C209	ECEA1HKS2R2	2.2	S 1
R869	ERJ3GEYJ473	47K	1	C210	ECUV1H102KBV	0.001	1
R870	ERJ3GEYJ684	680K	1	C211	PQCUV1E104MD	0.1	S 1
R871	ERJ3GEYJ224	220K	1	C212	PQCUV1E104MD	0.1	S 1
R872	PQ4R10XJ393	39K	S 1	C213	PQCUV1E104MD	0.1	S 1
R873	PQ4R10XJ474	470K	S 1	C214	ECUV1H270JCV	27P	S 1
R874	PQ4R10XJ183	18K	S 1	C215	ECUV1C104ZFY	0.1	1
R877	ERJ3GEYJ392	3.9K	1	C216	ECEA1EK470	47	S 1
R878	ERJ3GEYJ334	330K	1	C217	ECUV1H472KBV	0.0047	1
R879	ERJ3GEYJ332	3.3K	1	C218	ECUV1H221JCV	220P	1
R880	ERJ3GEYJ222	2.2K	1	C219	ECUV1H221JCV	220P	1
R881	ERJ3GEYJ563	56K	1	C220	PQCUV1C683KB	0.068	1
R890	ERJ3GEYJ104	100K	1	C221	PQCUV1E473MD	0.047	S 1
R891	ERJ3GEYJ105	1M	1	C222	PQCUV1H103KB	0.01	1
R962	PQ4R10XJ104	100K	S 1	C223	PQCUV1H331JC	330P	S 1
R963	PQ4R10XJ103	10K	S 1	C226	PQCUV1H222KB	0.0022	1
R964	PQ4R10XJ103	10K	S 1	C227	PQCUV1C683KB	0.068	1
R968	PQ4R10XJ103	10K	S 1	C228	ECUV1H472KBV	0.0047	1
R969	PQ4R10XJ103	10K	S 1	C229	ECUV1H101JCV	100P	1
J203	ERJ3GEY0R00	0	1	C230	ECEA1HKS010	1	S 1
J3	PQ4R10XJ000	0	1	C231	ECUV1C104KBV	0.1	1
J301	ERJ3GEY0R00	0	1	C232	ECUV1H221JCV	220P	1
J302	ERJ3GEY0R00	0	1	C235	PQCUV1E104MD	0.1	S 1
J501	ERJ3GEY0R00	0	1	C236	PQCUV1H102J	0.001	S 1
C118	PQ4R10XJ000	0	1	C237	ECUV1H560GCV	56P	1
C201	ERJ3GEY0R00	0	1	C238	ECUV1H510GCV	51P	1
C233	ERJ3GEY0R00	0	1	C239	ECUV1H560GCV	56P	1
C316	ERJ3GEY0R00	0	1	C241	PQCUV1C105ZF	1	1
C509	ERJ3GEY0R00	0	1	C242	PQCUV1E104MD	0.1	S 1
		(CAPACITORS)		C243	ECEA1EU4R7	4.7	1
C1	ECQE2224KF	0.22	△ 1	C245	ECEA1HKS010	1	S 1
C4	ECKD2H681KB	680P	△ S 1	C246	PQCUV1H153KB	0.015	1
C5	ECKD2H681KB	680P	△ S 1	C247	PQCUV1C224ZF	0.22	S 1
				C248	ECUV1H470JCV	47P	1
				C249	PQCUV1H103KB	0.01	1

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Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
C250	ECEA1CKS100	10	S 1	C833	ECUV1C104KBV	0.1	1
C251	PQCUV1E104MD	0.1	S 1	C834	ECUV1C104ZFB	0.1	1
C253	ECUV1H101GCV	100P	1	C835	ECUV1C104KBV	0.1	1
C254	PQCUV1H102J	0.001	S 1	C836	PQCUV1C105ZF	1	1
C255	PQCUV1E104MD	0.1	S 1	C837	ECUV1C683KBV	0.068	1
C273	ECUV1C104ZFB	0.1	1	C838	PQCUV1E104MD	0.1	S 1
C275	ECUV1H121GCV	120P	1	C839	PQCUV1C105ZF	1	1
C279	ECUV1H560JCV	56P	1	C840	PQCUV1E473MD	0.047	S 1
C280	ECUV1C104KBV	0.1	1	C841	PQCUV1H123MD	0.012	S 1
C281	ECUV1H472KBV	0.0047	1	C842	ECUV1H103KBV	0.01	1
C301	PQCUV1H103ZF	0.01	1	C843	ECUV1C104ZFB	0.1	1
C302	PQCUV1H220JC	22P	1	C845	PQCUV1E104MD	0.1	S 1
C303	ECUV1H270JCV	27P	1	C846	PQCUV1C683KB	0.068	1
C304	ECUV1H103KBV	0.01	S 1	C847	ECUV1H332KBV	0.0033	1
C305	ECUV1H470JCV	47P	1	C848	ECUV1H332KBV	0.0033	1
C306	ECUV1H470JCV	47P	1	C849	ECUV1H682KBV	0.0068	1
C307	ECUV1H470JCV	47P	1	C850	PQCUV1H223KB	0.022	1
C308	ECEA1HKS010	1	S 1	C851	ECUV1C104ZFB	0.1	1
C309	ECUV1H120JUV	12P	1	C852	ECEA1CKS220	22	S 1
C310	ECUV1H680JCV	68P	1	C853	ECEA0JU102	1000	1
C311	ECUV1H681JCV	680P	S 1	C854	ECEA1CKS470	47	S 1
C313	ECUV1C104KBV	0.1	1	C855	ECUV1H223KBV	0.022	S 1
C314	ECUV1H220JCV	22P	1	C856	PQCUV1H471JC	470P	S 1
C315	PQCUV1H103ZF	0.01	1	C857	ECUV1H102KBV	0.001	1
C374	ECUV1C104KBV	0.1	1	C858	ECEA1AKS221	220	S 1
C384	ECUV1C104KBV	0.1	1	C859	PQCUV1E104MD	0.1	S 1
C402	PQCUV1E104MD	0.1	S 1	C860	PQCUV1E333MD	0.033	S 1
C403	ECEA1CU471	470	1	C861	PQCUV1H561JC	560P	S 1
C404	ECEA1CU331	330	1	C862	PQCUV1E104MD	0.1	S 1
C406	ECEA1AU331	330	1	C863	PQCUV1H821JC	820P	S 1
C408	PQCUV1C224ZF	0.22	S 1	C864	PQCUV1H122KB	0.0012	1
C410	PQCUV1H103KB	0.01	1	C865	PQCUV1E333MD	0.033	S 1
C411	PQCUV1E104MD	0.1	S 1	C866	PQCUV1E104MD	0.1	S 1
C412	ECEA0JU331	330	1	C867	ECEA1AKS101	100	1
C413	ECEA0JKA331	330	1	C868	PQCUV1E104MD	0.1	S 1
C414	PQCUV1E104MD	0.1	S 1	C869	PQCUV1E104MD	0.1	S 1
C415	ECUV1E105ZF	1	1	C870	PQCUV1E104MD	0.1	S 1
C501	ECUV1H220JCV	22P	1	C871	PQCUV1E104MD	0.1	S 1
C502	ECUV1H220JCV	22P	1	C872	PQCUV1E473MD	0.047	S 1
C503	ECUV1C104ZFB	0.1	1	C875	PQCUV1E104MD	0.1	S 1
C504	ECUV1H180JCV	18P	1	C879	PQCUV1E104MD	0.1	S 1
C505	ECUV1H180JCV	18P	1	C881	ECUV1C104KBV	0.1	1
C510	EECW5R5D473	0.047	S 1	C890	ECUV1C104KBV	0.1	1
C511	ECUV1C104ZFB	0.1	1	D409	ECEA1HKS2R2	2.2	1
C512	ECUV1H103KBV	0.01	1				
C513	ECEA0JU102	1000	1				
C514	ECUV1C104ZFB	0.1	1				
C515	ECUV1C104ZFB	0.1	1				
C517	ECUV1C104ZFB	0.1	1				
C542	ECUV1C104KBV	0.1	1				
C543	ECUV1C104KBV	0.1	1				
C546	ECUV1C104ZFB	0.1	1				
C813	ECUV1H120JCV	12P	1				
C814	ECUV1H120JCV	12P	1				
C815	ECUV1H470JCV	47P	1				
C816	ECUV1H470JCV	47P	1				
C817	PQCUV1E104MD	0.1	S 1				
C818	PQCUV1C105ZF	1	1				
C819	ECUV1H101JCV	100P	1				
C820	ECUV1C104ZFB	0.1	1				
C821	ECUV1C104ZFB	0.1	1				
C822	ECEA1CK101	100	S 1				
C823	ECUV1H101JCV	100P	1				
C824	ECUV1C104ZFB	0.1	1				
C825	ECUV1C104ZFB	0.1	1				
C826	PQCUV1E104MD	0.1	S 1				
C827	PQCUV1E104MD	0.1	S 1				
C829	ECUV1C104ZFB	0.1	1				
C830	PQCUV1E104MD	0.1	S 1				
C831	PQCUV1C105ZF	1	1				
C832	PQCUV1C105ZF	1	1				

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REPLACEMENT PARTS LIST

Portable Handset

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.

After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by a Δ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) K=1000 Ω , M=1000K Ω

All capacitors are in MICRO FARADS (μ F) P= μ F

*Type &Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG Type	ECSZ Type	Others		
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V	
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V	
2E:250V	2:200V	1V:35V	1C :16V	1J :63V	
2H:500V		0J:6.3V	1E,25:25V	2A :100V	

Ref. No.	Part No.	Part Name & Description	Pcs/Set
MAIN P.C.BOARD PARTS			
PCB100	PQWP1CM422BR	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC201	XN1116	IC	1
IC202	PQVI0008GE33	IC	1
IC203	PQVIS80730AL	IC	1
IC204	PQVIXCC3501P	IC	1
		(TRANSISTORS)	
Q1	PQVTDTC114EU	TRANSISTOR(SI)	1
Q2	PQVTDTC114EU	TRANSISTOR(SI)	1
Q201	2SD601A	TRANSISTOR(SI)	1
		(or 2SC2712GRTE85)	
Q202	2SD601A	TRANSISTOR(SI)	1
		(or 2SC2712GRTE85)	
Q203	2SB709A	TRANSISTOR(SI)	1
		(or 2SA1162GRTE85)	
Q204	PQVTD123T146	TRANSISTOR(SI)	S 1
Q205	PQVTD123T146	TRANSISTOR(SI)	S 1
Q206	PQVT143XK146	TRANSISTOR(SI)	1
		(DIODES)	
D201	MA110	DIODE(SI)	1
D202	MA110	DIODE(SI)	1
D203	MA728	DIODE(SI)	1
D204	PQVDS5688G	DIODE(SI)	1
D208	MA110	DIODE(SI)	1
LED201	LNJ301MPUJA	LED	1
LED202	LNJ301MPUJA	LED	1
LED203	LNJ301MPUJA	LED	1
LED204	LNJ301MPUJA	LED	1
LED205	LNJ301MPUJA	LED	1
LED206	LNJ301MPUJA	LED	1
LED207	PQVDSL210VC	LED	1
LED208	PQVDSL210VC	LED	1
		(COILS)	
L201	PQLQZMR68M	COIL	S 1
L202	PQLQZM100K	COIL	1
L203	PQLQZM220K	COIL	1
L204	PQLQZM1R0K	COIL	1
L205	ELJFAR68M	COIL	1
		(CRYSTALS)	
X201	PQVCJ3992N9Z	CRYSTAL OSCILLATOR	1
X202	PQVCL3276N9Z	CRYSTAL OSCILLATOR	1
		(CONNECTORS)	
CN101	PQJP2D13Z	CONNECTOR	1
CN201	PQJS12A36Z	CONNECTOR	1
		(OTHERS)	
E100	PQEFBDB111GP	BUZZER	1
E101	PQJM122Z	MICROPHONE	1
E102	PQMC10265Z	SHIELD COVER	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
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CABINET & ELECTRICAL PARTS

100	PJHE5065Z	SCREW	2
101	PQAX3P16Z	SPEAKER	1
102	PQBX10288Z	BUTTON (BLACK)	1
102	PQBX10288Y	BUTTON (WHITE)	1
103	PQXA36ASVC	RECHARGEABLE BATTERY	1
104	PQHR10559Z	RF HOLDER	1
105	PQJT10137Z	BATTERY TERMINAL	3
106	PQKF10202Z2	REAR CABINET (BLACK)	1
106	PQKF10202Y1	REAR CABINET (WHITE)	1
107	PQKK10081Z2	BATTERY COVER (BLACK)	1
107	PQKK10081Z1	BATTERY COVER (WHITE)	1
108	PQKM10277Z4	FRONT CABINET (BLACK)	1
108	PQKM10277Z3	FRONT CABINET (WHITE)	1
109	PQSA10065Y	ANTENNA (BLACK)	1
109	PQSA10065Z	ANTENNA (GRAY)	1
110	PQSX10057Z	KEY BOARD SWITCH	1
111	PQHE10070Z	SPACER	1
112	PQHG10479Z	SPACER	1

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Ref. No.	Part No.	Part Name & Description	Pcs/Set
R27	PQ4R10XJ183	18K	1
R28	PQ4R10XJ822	8.2K	1
R201	PQ4R10XJ104	100K	1
R202	PQ4R10XJ334	330K	1
R203	PQ4R10XJ334	330K	1
R204	PQ4R10XJ331	330	1
R205	PQ4R10XJ103	10K	1
R206	PQ4R10XJ472	4.7K	1
R208	PQ4R10XJ104	100K	1
R209	PQ4R10XJ331	330	1
R211	PQ4R10XJ472	4.7K	1
R212	PQ4R10XJ472	4.7K	1
R213	PQ4R10XJ473	47K	1
R215	PQ4R10XJ104	100K	1
R217	PQ4R10XJ333	33K	1
R219	PQ4R10XJ104	100K	1
R220	PQ4R10XJ473	47K	1
R221	PQ4R10XJ122	1.2K	1
R222	PQ4R10XJ222	2.2K	1
R223	PQ4R10XJ103	10K	1
R224	PQ4R10XJ332	3.3K	1
R225	PQ4R10XJ104	100K	1
R226	PQ4R10XJ104	100K	1
R228	PQ4R10XJ681	680	1
R229	PQ4R18XJ681	680	1
R230	PQ4R10XJ681	680	1
R231	PQ4R10XJ681	680	1
R232	PQ4R10XJ221	220	1
R234	PQ4R10XJ332	3.3K	1
R238	PQ4R10XJ103	10K	1
R240	PQ4R10XJ120	12	1
R241	PQ4R18XJ102	1K	1
R245	PQ4R10XJ331	330	1
R246	PQ4R10XJ331	330	1
R251	PQ4R10XJ270	27	1
R252	PQ4R10XJ153	15K	1
J207	PQ4R10XJ000	0	1
C203	ECEA0GKS221	220	1
C205	PQCUCV1C105ZF	1	1
C208	PQCUCV1H103ZF	0.01	1
C209	PQCUCV1C105ZF	1	1
C210	PQCUCV1C105ZF	1	1
C211	PQCUCV1H103ZF	0.01	1
C212	PQCUCV1H103ZF	0.01	1
C213	PQCUCV1H103ZF	0.01	1
C214	PQCUCV1H470JC	47P	1
C215	PQCUCV1H470JC	47P	1
C216	PQCUCV1H270JC	27P	1
C217	PQCUCV1H270JC	27P	1
C218	PQCUCV1H103ZF	0.01	1
C219	PQCUCV1H103ZF	0.01	1
C220	PQCUCV1E104MD	0.1	S 1
C221	PQCUCV1E104MD	0.1	S 1
C222	PQCUCV1E104MD	0.1	S 1
C223	PQCUCV1E104MD	0.1	S 1
C225	PQCUCV1H182KB	0.0018	1
(RESISTORS)			
(CAPACITORS)			
(CRYSTAL)			
(CONNECTOR)			
(RESISTORS)			

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Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R24	ERJ3GEYJ223	22K	1	C53	ECUV1H820JCV	82P	1
R33	ERJ3GEYJ332	3.3K	1	C101	ECUV1H330JCV	33P	1
R34	ERJ3GEYJ154	150K	1	C104	ECUV1H220JCV	22P	1
R35	ERJ3GEYJ103	10K	1	C105	ECUV1H103KBV	0.01	S 1
R36	ERJ3GEYJ104	100K	1	C106	ECUV1H680JCV	68P	1
R37	ERJ3GEYJ562	5.6K	1	C107	ECUV1H470JCV	47P	1
R38	ERJ3GEYJ182	1.8K	1	C111	ECUV1H220JCV	22P	1
R39	ERJ3GEYJ222	2.2K	1	C112	ECUV1H100DCV	10P	1
R101	ERJ3GEYJ561	560	1	C113	ECUV1H150JCV	15P	1
R102	ERJ3GEYJ220	22	1	C114	ECUV1H102KBV	0.001	1
R103	ERJ3GEYJ223	22K	1	C115	ECUV1H103KBV	0.01	S 1
R104	ERJ3GEYJ273	27K	1	C116	ECUV1C104ZFV	0.1	1
R108	ERJ3GEYJ472	4.7K	1	C117	ECUV1H151JCV	150P	1
R109	ERJ3GEYJ822	8.2K	1	C118	ECUV1H3R0BCV	3	1
R110	ERJ3GEYJ393	39K	1	C119	ECUV1C104ZFV	0.1	1
R112	ERJ3GEYJ470	47	1	C120	ECUV1C104ZFV	0.1	1
R113	ERJ3GEYJ823	82K	1	C501	ECUV1H103KBV	0.01	S 1
R116	ERJ3GEYJ683	68K	1	R115	ECUV1H103KBV	0.01	S 1
R117	ERJ3GEYJ564	560K	1				
R500	ERJ3GEYJ220	22	1				
R501	ERJ3GEYJ393	39K	1				
C1	ERJ3GEY0R00	0	1				
C37	ERJ3GEY0R00	0	1				
C102	ERJ3GEY0R00	0	1				
		(CAPACITORS)					
C3	ECST1EY474	0.47	1				
C4	ECUV1H102KBV	0.001	1				
C5	PQCUV1E104MD	0.1	S 1				
C6	ECEA0JKS470	47	1				
C7	ECUV1C104ZFV	0.1	1				
C8	ECUV1H270JCV	27P	S 1				
C9	ECUV1H221JCV	220P	1				
C10	ECUV1H472KBV	0.0047	1				
C11	ECUV1H221JCV	220P	1				
C12	PQCUV1C683KB	0.068	1				
C13	PQCUV1C105ZF	1	1				
C14	ECEA1CKS100	10	1				
C15	PQCUV1C224KB	0.22	1				
C16	ECUV1H103KBV	0.01	1				
C17	PQCUV1C224KB	0.22	1				
C18	ECUV1H153KBV	0.015	1				
C20	ECUV1H223KBV	0.022	S 1				
C21	ECUV1H220JCV	22P	1				
C22	ECUV1C104ZFV	0.1	1				
C23	ECUV1H102KBV	0.001	1				
C24	ECEA1CKS220	22	1				
C25	ECSTAJ1CA225	2.2	S 1				
C26	PQCUV1C224KB	0.22	1				
C27	ECUV1H102KBV	0.001	1				
C28	ECUV1H122KBV	0.0012	1				
C29	ECUV1C473KBV	0.047	1				
C30	ECUV1H103KBV	0.01	1				
C32	ECUV1C104ZFV	0.1	1				
C34	ECUV1H560GCV	56P	1				
C35	ECUV1H560GCV	56P	1				
C36	ECUV1H560GCV	56P	1				
C39	ECUV1H103KBV	0.01	1				
C40	ECUV1H222KBV	0.0022	1				
C41	ECEA1HKS010	1	1				
C42	ECUV1H221JCV	220P	1				
C43	ECUV1H103KBV	0.01	1				
C45	ECUV1H102KBV	0.001	1				
C46	ECUV1H102KBV	0.001	1				
C47	ECUV1H102KBV	0.001	1				
C48	ECUV1C104ZFV	0.1	1				
C49	ECUV1H103KBV	0.01	S 1				
C50	ECUV1C104KBV	0.1	1				
C52	ECUV1C104KBV	0.1	1				

KX-TCM422-B/KX-TCM422-W			
Ref. No.	Part No.	Part Name & Description	Pcs/Set
ACCESSORIES			
A1	KX-A11-6	AC ADAPTOR	△ 1
A2	PQJA10075Z	TEL CORD	△ 1
A3	PQKL10028Z2	WALL MOUNT BRACKET (BLACK)	1
A3	PQKL10028Z1	WALL MOUNT BRACKET (WHITE)	1
A4	PQQT11156Y	TEL CARD LABEL	1
A5	PQQW11769Z	QUICK REFERENCE GUIDE (English)	1
A6	PQQW11770Z	QUICK REFERENCE GUIDE (Spanish)	1
A7	PQQX11748Z	INSTRUCTION BOOK	1
PACKING MATERIALS			
P1	PQPH75Z	PROTECTION COVER (for Portable Handset)	1
P2	PQPH89Y	PROTECTION COVER (for Base Unit)	1
P3	PQPD10350Z	MANUAL BOX	1
P4	PQPN10598Z	CUSHION	1
P5	PQPN10599Z	ACCESSORY BOX	1
P6	PQPK12333Z	GIFT BOX (BLACK)	1
P6	PQPK12334Z	GIFT BOX (WHITE)	1
TOOL			
ZZ1	PQZZ12K11Z	EXTENSION CORD, 12P	1
Note: PQZZ12K11Z is useful for servicing (It make servicing easy).			